AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING
SHEET METAL CONTRACTING



THE
AIR
NDITIONING
ECTION

PAGE 31

TABLISHED
8 8 0

AUGUST
1 9 3 7



Our Customers Control Our Sheet Mill Schedules

Doesn't matter how busy Youngstown's sheet mills may be, they are scheduled not by the operating department (which would be the easy way for us) but by the sales department for the convenience and service of you, our regular customer. You as a customer might have some sudden demand put upon you, or you might need a different gauge or analysis of steel quickly. When that happens, remember that Youngstown's mills are manned by a bunch that's ready to turn the place upside-down to serve you.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels • **General Offices, Youngstown, Ohio**

Sheets • Plates • Pipe and Tubular Products • Conduit • Tin Plate • Bars • Rods • Wire • Nails • Unions • Tie Plates and Spikes

11-1

YOUNGSTOWN



New Spiroidal Blower

High pressure—quiet—almost double the useful working pressure of conventional centrifugal blowers having same air volume and power requirement.

Model C-37
List Price $130

As illustrated; includes 8-speed, 1/5 H.P. vertical capacitor motor, fan switch, two 20x30-inch filters and remote control box.

ALL-YEAR-AIR CONDITIONED

The Only Equipment

available today providing COMPLETE WINTER AIR-CONDITIONING and SUMMER COOLING that the average home-owner can afford either to buy or to operate

Every one of the 9,000,000 homes now equipped with warm-air heat, is a prospect for the new Model C-37 ALL-YEAR-AIR unit. This Summer-Winter unit offers more for the money than any air conditioning unit on the market. The spiroidal blower sets entirely new standards of performance that have been proven in the severest comparative tests. ALL-YEAR-AIR means continuous year-round sales, pleased customers and a very good profit margin for sheet metal and furnace dealers.



MODEL A-37 List Price **$250**

This very complete winter air-conditioning and summer cooling unit offers the additional advantages of double filter capacity; Ozone Generator to destroy undesirable odors; "Vital Ionizer" to activate and normalize indoor air and a humidifier, automatically controlled. • Model B-37, without Ozone Generator, Humidifier and Ionizer, list price $180.

Write for sales building plan and detailed literature

Manufactured by AIR CONDITIONING DIVISION, Auburn Automobile Company, Connersville, Ind.

Address inquiries to General Sales Office, Bankers Building, 105 West Adams Street, Chicago, Illinois

In This Issue

THIS month's cover illustration was made from a photograph taken in the shop of the Frank B. Clayton Company in Philadelphia. The operator is welding the formed corners of a sled for one of the football machines this firm fabricates. A complete description of the firm's unusual operations begins on page 16.

★

Sometimes the blow pipe specialist is called upon to ventilate processing tanks highly dangerous to workmen. The final installation **must** be right. A system handling sulphuric acid is described on page 19.

★

Too many contractors, it seems, cannot see anything important in grinding and polishing their stainless steel welds. Yet economical polishing calls for an intimate knowledge of grinding wheels, wheel speeds, buffing materials, etc. The second article on this subject is on page 20.

★

Prefabricated metal houses are increasingly interesting—and demanding public consideration. In the east, prefabricated houses of copper are making headway. On page 26 we describe these houses and point out their features of interest.

★

Some progress has been made in cooling where the greater portion of comfort is obtained by drying the air to make the air absorptive. A doctor's offices, cooled mostly by drying, is described on page 47. Reduction of the sensible heat load is accomplished by water from a private well.

★

On page 48, S. Konzo concludes his three part series on night air cooling. This article explains the limitations of attic and basement fans.

★

The reprinted booklet on well water cooling is concluded in this issue. Page 50. Two actual examples are taken and cooling worked out step by step. Many requests have been received for this booklet. Readers who have not saved the three parts (June, July, August), may write us for tear sheets or for the address of the publishers of the booklet.

★

Our explanation of the new technical code carries on with a discussion of infiltration. Using the same Michigan State College house plans we show how infiltration is calculated and converted into cfm of inleaking air. Page 52.

★

Factory offices seem bound to be an active cooling field. Such an office cooled by well water supplemented by a small refrigeration tonnage is presented on page 54. The arrangement of the system is shown in details.

AMERICAN ARTISAN

With which is merged

FURNACES and SHEET METALS AND Warm-Air Heating

Covering All Activities in

Gravity Warm Air Heating — Forced Warm Air Heating
Sheet Metal Contracting — Ventilating
Air Conditioning

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor — Brewster S. Beach, Consulting Editor

Vol. 106, No. 8 — August, 1937 — Founded 1880

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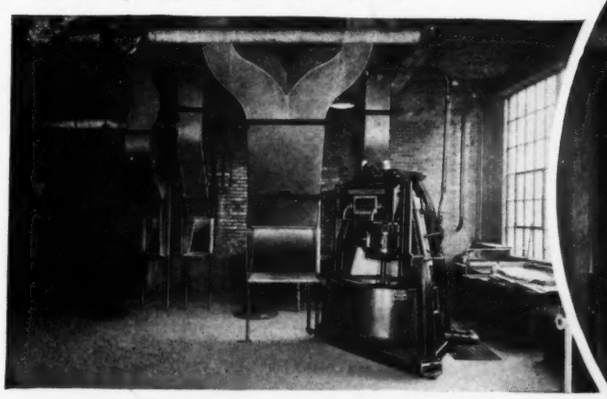
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More than 8,000 Copies of this Issue are being distributed

As long as laundries care for CLOTHES *—and* COSTS!

Monel Chutes. *This chute job would be a good one to get in any material—but in Monel it's tops. The customer will not need repairs or replacements for years to come. For the sheet metal worker who did the job it was tops because there was more in it for him.*





Monel Starch Cookers. *These two were supplied to a prominent laundry on the Pacific Coast. Monel in no way harmfully contaminates the starch. Made of light gauge Monel sheet and equipped with Monel covers and Monel piping.*

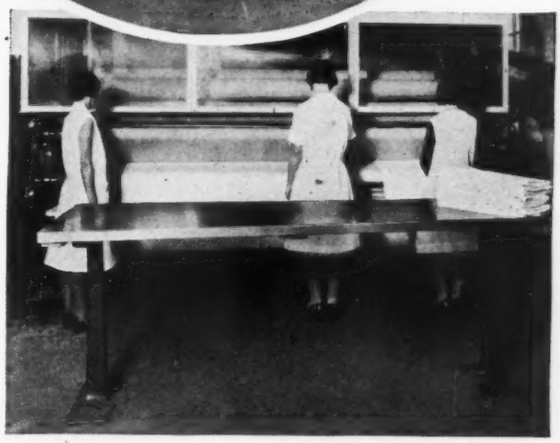
. . . they need these five jobs that YOU can DO

HOW long since you've made the rounds of the laundries near you? Right on this page are 5 good reasons why you shouldn't wait any longer.

Every job here made profits for some sheet metal man who knows his Monel.* They're all items the laundry uses . . . and Johnny-on-the-spot usually lands them.

Remember, the laundries KNOW Monel . . . you don't have much explaining to do. They've used it for years in their washers: they know it can't rust, and resists corrosion. They know it's strong and tough and long-lived.

So about all you have to convince them is that you're the chap who knows how to fabricate Monel. Write us to-day if you need information on forms and sizes available and prices. Then take this page along and start out to make calls: you'll find them profitable calls.

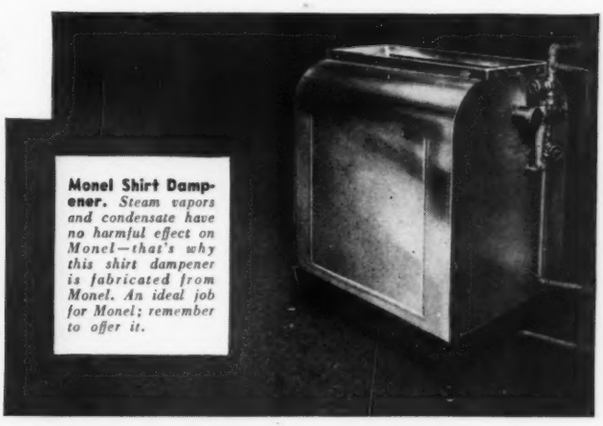


Monel Tables. *One of the outstanding sheet metal applications for Monel in the laundry. Using moderately light gauge Monel sheet, tables can be covered at economical cost. Monel-topped tables appeal to laundry operators as they are proof against rust and splinters; they are easily cleaned, attractive and durable.*

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.



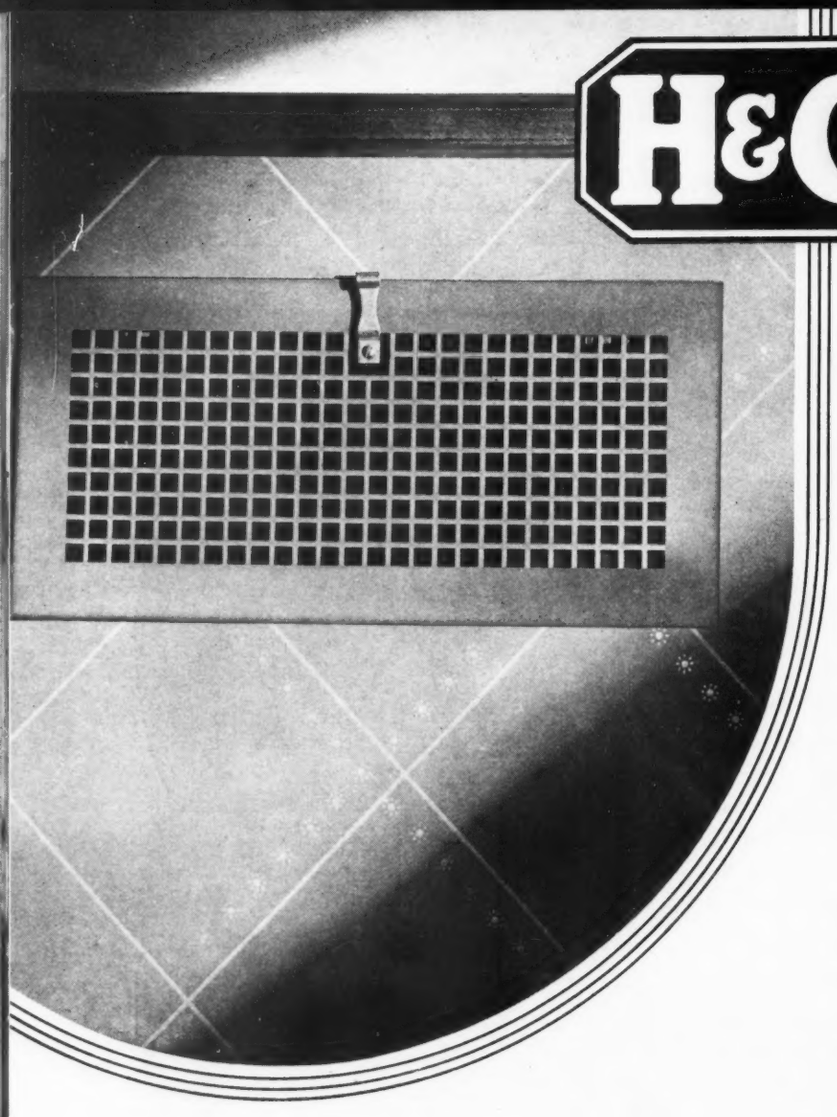
Monel Plant Trucks. *Practically every laundry uses plant trucks (usually about 24"x36"x24" deep) to transfer the cleaned wet garments from the washers to extractors and then to drying tumblers. Easily fabricated from light gauge Monel sheet .028" and .031" thick.*



Monel Shirt Dampener. *Steam vapors and condensate have no harmful effect on Monel—that's why this shirt dampener is fabricated from Monel. An ideal job for Monel; remember to offer it.*

MONEL

*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.



H&C No. 71 DESIGN

A Splendid, Low Cost Air Conditioning Grille

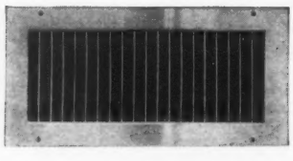
WHERE price is a factor, and directional control of air-flow is not imperative, the H & C No. 71 fills the bill in admirable fashion. The simple lattice design quietly blends into almost any scheme of decoration, and the openings (3/8 inch square) are small enough to effectively conceal the duct without building up excessive resistance. (Price Group A)

Like all the other members of the very comprehensive H & C line of Air Conditioning grilles, the No. 71 is available in a choice of six installation frames which assure the utmost in convenient, neat and efficient installations.

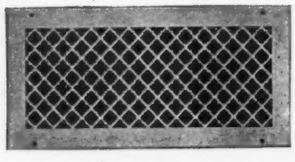
There's a real advantage in standardizing on the H & C line. It contains grilles and registers ideally suited to every type of installation—each thoroughly engineered and built to highest standards of quality.

Air Conditioning Catalog No. 37A.C. sent free upon request.

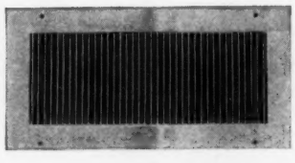
Other H&C Designs



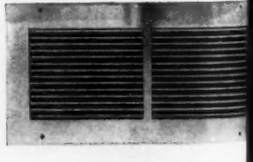
No. 72 DESIGN
Combines bar type construction, neat appearance, unusually large free area with low cost. Depth of bars is 3/8". Price Group A.



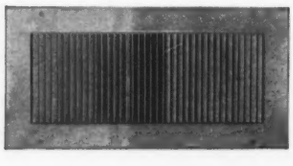
No. 76 DESIGN
Inexpensive — A favorite with many because of its attractive appearance which harmonizes with any interior. Price Group B.



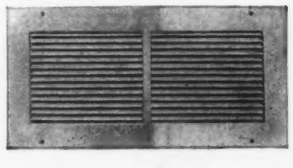
No. 77 DESIGN
Made up of bars 3/8" in depth spaced 3/8" apart. Affords neat appearance, effective concealment of duct at very modest cost. Price Group B.



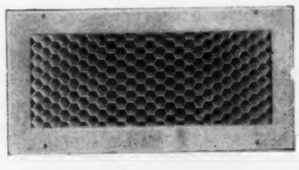
No. 78 DESIGN
Similar construction to No. 77 except bars are horizontal. Center mullion further enhances appearance. Price Group B.



No. 84 DESIGN
Adjustable bar type. Sectional adjustment provides, easily and quickly, any deflection or combination of deflections desired. Price Group D.



No. 85 DESIGN
Similar in construction to No. 84. Downward adjustment of bars when located near the ceiling avoids streaked ceilings. Price Group D.



No. 90 DESIGN
Provides Dual Control of air-flow, both vertically and sideways. Exceptional depth (1") results in advantages obtainable with no other grille. Price Group E.

Streak-proof sponge rubber gasket now furnished as standard on all 3-piece sidewall registers at no extra cost.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers — Air Conditioning Grilles
Damper Regulator Sets — H&C — Dampers, Chain, Pulleys

61 W. KINZIE STREET, CHICAGO, ILLINOIS

ENGINEERING OFFICE AND FACTORY · HOLLAND · MICH·

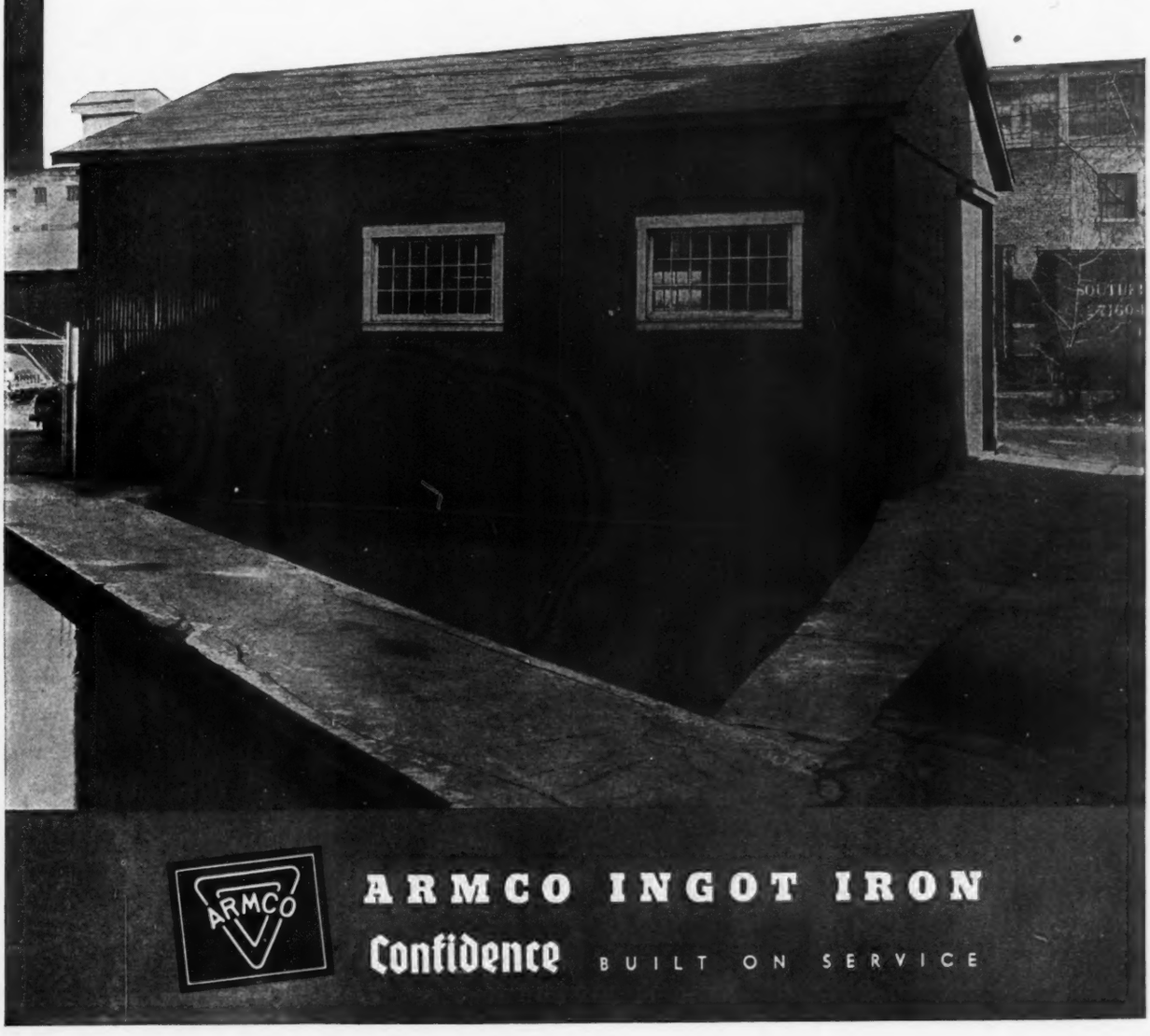


HOW LONG WILL IT LAST?

THAT'S a logical question to apply to sheet metal—one that frequently has an important bearing on sales. If you are one of the many contractors selling ARMCO Ingot Iron, here is convincing evidence in answer.

For more than a quarter-century the galvanized ARMCO Ingot Iron siding on this building has withstood unusually severe conditions. Erected in 1911, the building straddles a hydraulic canal used in paper making. A nearby railroad siding as well as the paper mill contribute to the corrosive industrial atmosphere. Still another bad condition is the constant dampness caused by a steam trap exhausting directly under the floor.

Such faithful service generates public confidence in ARMCO Ingot Iron. Use this specific evidence to gain profitable sales. And as you sell, order your stocks from the nearby Armco Distributor. The American Rolling Mill Company, Executive Offices, Middletown, Ohio.



ARMCO

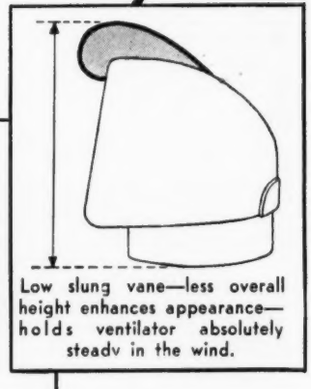
ARMCO INGOT IRON

Confidence BUILT ON SERVICE

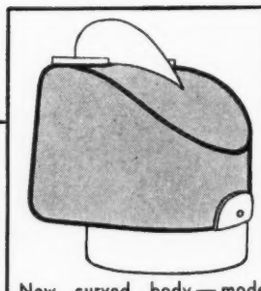
Again Swartwout Leads with a NEW Rotary VENTILATOR



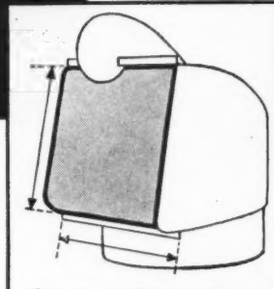
Superior Construction



Low slung vane—less overall height enhances appearance—holds ventilator absolutely steady in the wind.

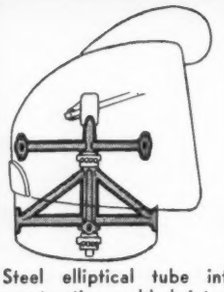


New curved body — modern lines. Pleasing to look at—provides the ultimate in efficient operation.

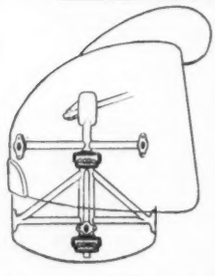


Oversize outlet provides extra large capacity under all operating conditions.

Super Performance



Steel elliptical tube interior construction welded into one-piece frame. Most rigid construction known.

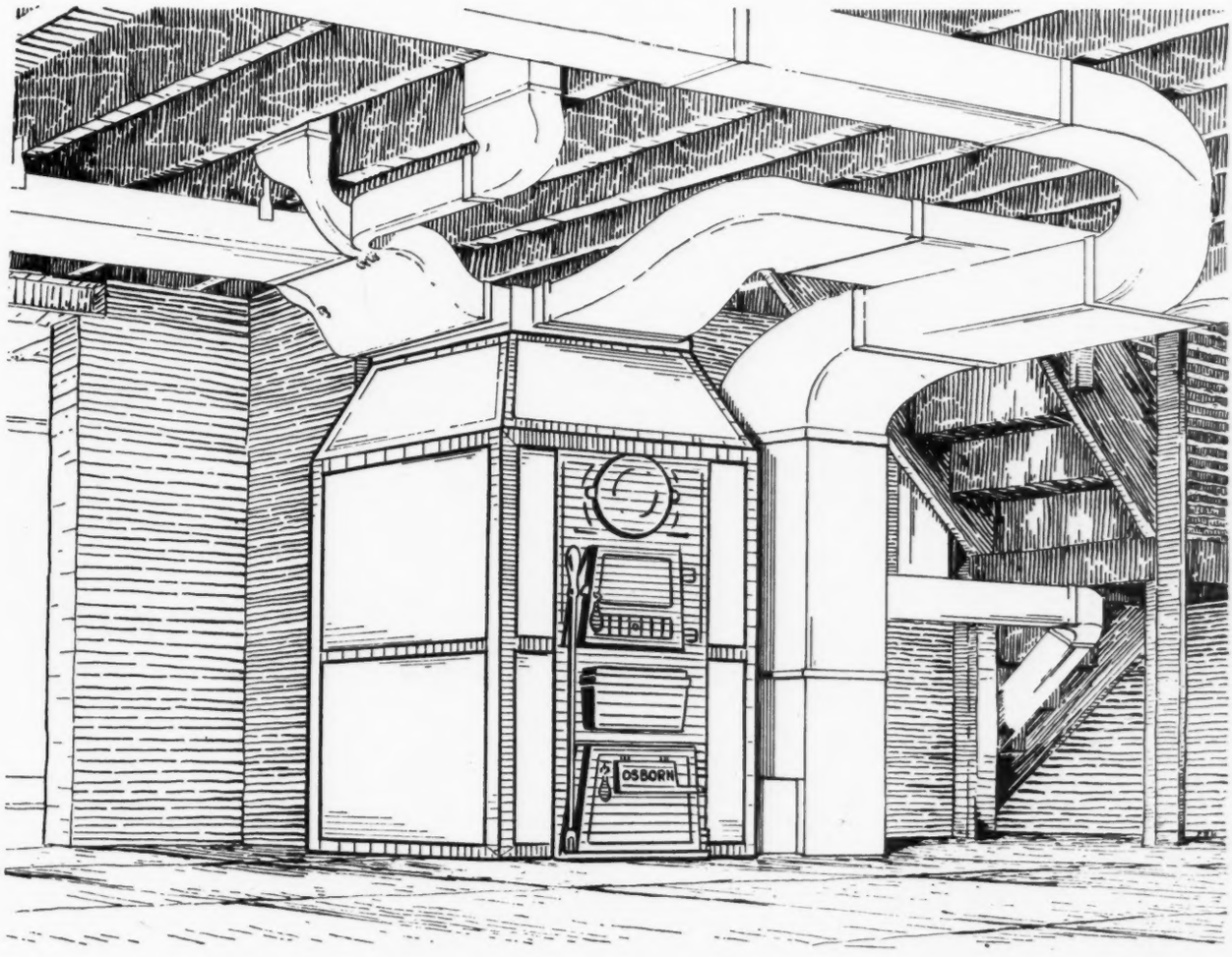


Stainless steel ball bearings in dustproof housings. Never need lubricating or attention.

This new Swartwout Rotary with its great capacity will win you new friends and satisfied customers. And you'll find it profitable as well as satisfying. Engineering assistance is rendered by any Swartwout Representative without obligation. Write today for data.

THE SWARTWOUT COMPANY
18615 EUCLID AVENUE CLEVELAND, OHIO

MORE AIR PER MINUTE PER DOLLAR



AUTUMN'S ROAD TO PROFITS

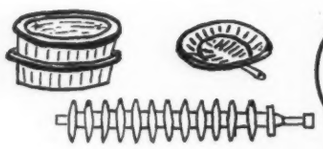
You know, of course, that this is heating season time, but do you know that every item of material you need for the successful carrying on of this fall work can be secured from one dependable source—from OSBORN?

Whether you require pipe and fittings to rebuild a simple gravity job; or a furnace, blower, duct materials, automatic humidifier and controls for a complete winter air-conditioning system—OSBORN has them. More important, especially to your customers, every product you get from OSBORN is of highest quality and a leader in its field.

If you are figuring on heating jobs—and you should because it is profitable business—figure too on using OSBORN materials. Of the thousands of sheet metal men who do, many will tell you that having this one dependable buying source is one of the biggest factors in their success.

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO—CLEVELAND—DETROIT
Metals and Metal Products
A DEPENDABLE SOURCE OF SUPPLY FOR 79 YEARS

WE HAVE EVERYTHING





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NORCO PRODUCTS:





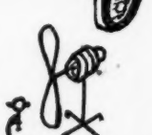




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Furnace Check Damper
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Repairs for all Makes of Furnaces & Boilers
Shovels
Snips
Soot Destroyers
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Spring Handles
Stove Boards
Steel Furnaces
Stove Cleaner
Stove Knobs
Stove Lid Lifters
Stovepipe Collars
Stovepipe Dampers
Stovepipe Elbows (Corrugated and Adjustable)
Stovepipe
Stovepipe Tees
Stovepipe Wire
Stove Pokers
Stove Polish
Stove Putty
Stove Repairs
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Tees
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Wicks
Wire
















NORTHWESTERN STOVE REPAIR CO.

Manufacturers of Stove, Furnace and Boiler Repairs

662 WEST ROOSEVELT ROAD, CHICAGO, ILL.





"GIVE ME SUPERIOR FOR FITTINGS THAT FIT"



"I want a sheet," says this prominent contractor, "that works up easily and accurately into any shape or size fitting — a sheet that I don't have to worry about peeling or cracking when forming or seaming. I can always bank on SUPERIOR."

SUPERIOR GALVANIZED STEEL SHEETS are uniformly that kind — uniformly tempered for workability — uniformly coated for long service — uniformly satisfactory to contractor, workman and customer.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio

Division of Continental Steel Corporation

IOR SHEET STEEL CO. TRADE MARK REGISTERED CANTON, O.

Superior Galvannealed PATENTED PROCESS TRADE MARK

PERIOR GALVANNEALED has a hot-dipped zinc coating, t-treated — providing a rust resisting coating that does not or scale under severe forming. Its "velvet-like" surface is al for painting.

SUPERIOR

OPEN HEARTH STEEL SHEET

SUPERIOR GALVANNEALED
"SUPER-METAL"

GALVANIZED SHEETS
GALVANIZED ROOFING

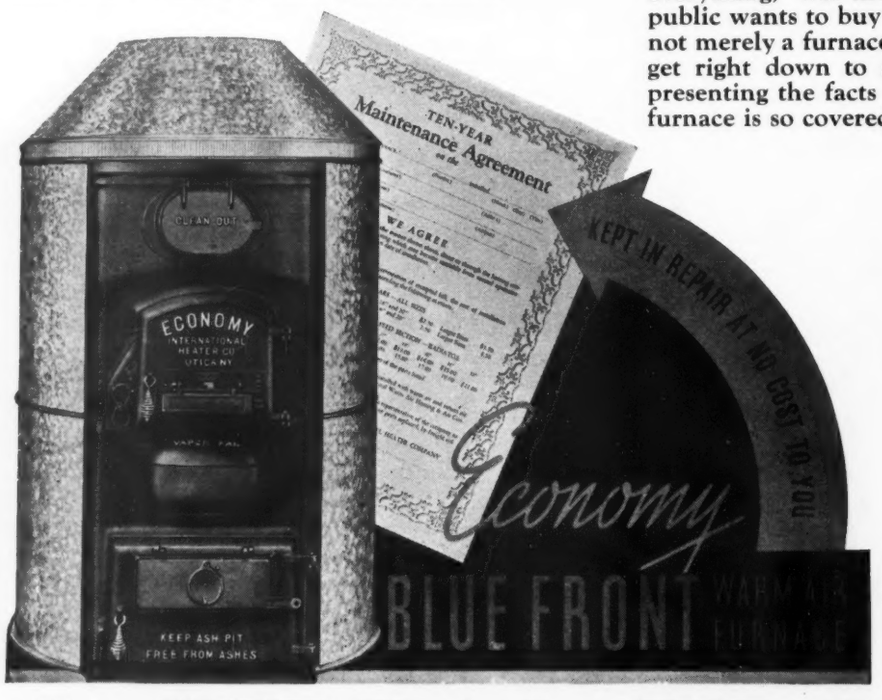
HOT ROLLED ANNEAL
PICKLED and

INTERNATIONAL PRESENTS *a new idea-* DOUBLE MAINTENANCE GUARANTEE

Suppose you could go to a home owner, an architect or a builder and tell him you will *Keep in Repair FREE for 10 Years* the furnace you are offering . . . no other furnace carries the same plan . . . would that place you in a splendid competitive position, particularly since you would not have to charge more than for other good furnaces?

This plan is your plan . . . it is brought out for the dealer . . . it eliminates all questionable replacements . . . it reimburses you for installation costs . . . it puts you in a position to sell at a profit against any and all competition.

"Never mind the Furnace . . . this protection covers everything," was the comment of one owner. The public wants to buy satisfaction and protection . . . not merely a furnace and in no better way can you get right down to signing the contract than by presenting the facts of this plan . . . and no other furnace is so covered.



The display card shown here in black and white is of three colors die cut, for use as a window or counter display.

A postal card will bring full information. You really cannot afford not to be able to offer this most powerful of all sales arguments . . . "Kept in repair at no cost for 10 years."

•

. . . Stocks carried at over 100 points for quick delivery and low freight costs.

Western Office and Warehouse
1933 Wentworth Ave.
Chicago

INTERNATIONAL HEATER COMPANY

UTICA, N.Y., U.S.A.

ANOTHER BIG DIFFERENCE BETWEEN GENUINE PARKER-KALON SHEET METAL SCREWS AND IMITATIONS



HERE'S
ONE MORE "SECRET"
THAT SAVES YOU TROUBLE

PARKER-KALON'S EXCLUSIVE HARDENING PROCESS is another important reason for demanding genuine Parker-Kalon Sheet Metal Screws. In this process we employ furnaces which we developed and patented especially for this one heat treating job. Perfect hardening is further assured by the Parker-Kalon Laboratory which determines individual routines of treatment for different sizes of screws . . . using the most modern scientific equipment such as shown in the photo at left.

To every sheet metal worker this unique hardening process employed by Parker-Kalon is insurance against trouble. It means that genuine Parker-Kalon Sheet Metal Screws will always work right . . . that threads won't strip and heads won't twist off. It is one of many reasons . . . found throughout Parker-Kalon's plant and laboratory . . . why genuine Sheet Metal Screws give UNIFORMLY PERFECT RESULTS in contrast to the uncertain action of imitations that look the same.

When you specify Parker-Kalon Sheet Metal Screws you make certain that savings of assembly time and labor will not be wiped-out by trouble. They always hold because threads run full diameter right to the head. They always go in easily because the threads are designed for the work they must perform and held to a high degree of uniformity. Their threads don't strip, nor do the heads twist off because they are made from a special analysis wire and are hardened by an exclusive process.

PARKER-KALON CORPORATION, 190 Varick Street, New York, N. Y.

HARDENED
PARKER-KALON SHEET METAL SCREWS
SELF-TAPPING

SOLD ONLY BY RECOGNIZED DISTRIBUTORS

A few recently-built houses... all with

Anaconda Economy Copper Roofing



1936 "Good Housekeeping" House in Wychwood, Westfield, N. J. Architect: *Dwight James Baum, Riverdale-on-Hudson, N. Y.*

PROVIDING all of copper's traditional charm and dignity, Anaconda *Economy* Copper Roofing is offered especially for residential use. Lighter weight (10 oz. metal) reduces cost. Narrower sheets (13¾" between seams) are more in keeping with small roof areas, and provide approximately the same rigidity and wind resistance as wider sheets of heavier metal. You have the men, the tools, the experience to go after this profitable business. Stocked by Anaconda distributors.

ANACONDA

37221-A

THE AMERICAN BRASS COMPANY

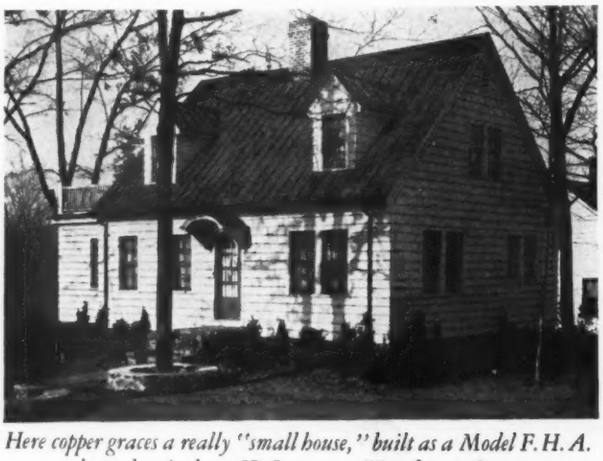
General Offices: Waterbury, Conn. *Offices and Agencies in Principal Cities*
In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario



"Character Home" was built by Hutzler & Carr, Inc., in Richmond, Va. Architect: *Edward F. Sinnott, Richmond, Va.*



Built in Marblehead, Mass., and designed by Donald C. Goss, Architect, *Boston, Mass. Copper was used extensively throughout.*



Here copper graces a really "small house," built as a Model F. H. A. home by Andrew H. Larsen at Waterbury, Conn.



This home with Anaconda Copper roof is in Newton Highlands, Mass. Built by Davis & Vaughan, Boston, Mass.

AMERICAN ARTISAN

Volume 106 Number 8

Unfinished Business

THE old time tinsmith had a bed of roses. That is, by comparison with his modern successor.

Usually he learned his trade as an apprentice to a local tinsmith and went to work as a journeyman locally or, if he had itching feet, for many men in many places. He learned the tricks of the trade—and there weren't many—here, there and piecemeal. If he was inquisitive he accepted or rejected the do's and dont's according to his own experience and by slow progress became a skilled craftsman.

Eventually he decided whether to continue working for others or to go into business for himself. If the latter, he looked around for a likely town and either bought or set himself up in business. His needs were few—hand tools and simple machines—a small stock of material.

Once established, he became the place of business for folks with things to be done in metal; his judgment was accepted if he was honest, industrious and well liked. His heating problems (if he did heating) were sketchy, for townspeople were accustomed to wearing plenty of clothing and were not too critical of heating—they had not been educated.

From year to year he continued much along the same line, with seldom any incentive to be overly imaginative. He laid aside a little money, raised his family and eventualy died—a good friend, an honest business man, an acknowledged technician.

Simple, almost idyllic in retrospect.

Granting that today a man can learn his trade in much the same way or by accelerated schooling, how different is the situation which faces him when he decides to go into business. Immediately the problems of conduct of business must be met and decided. A sole proprietorship? A partnership? A corporation? Local, state and national governments await the decision because their incomes depend upon the decision made.

A small shop run and manned by the owner? Or a shop employing mechanics? Even the location is something to be considered in detail, for no town these days with any business to speak of is not already overcrowded with big shops and small shops. And in what type of work is the man best fitted to specialize, for specialize he must, whether he wants to or not, because under present conditions it is not possible for a man to be a specialist in all the ramifications of this sheet metal working industry.

What he decides to concentrate upon will determine his equipment needs—the amount and kind of machinery and tools needed; to some extent the actual location—for services which must be sold intensively do not go so good from back streets and outlying areas.

Shall it be heating or metal work, or both? If metal work—ventilation, air conditioning, architectural metal, specialty item manufacture, industrial material handling? Or, if heating, shall it be straight gravity furnaces, or winter air conditioning, or summer cooling, or all combined? And shall there be oil burners and stokers and gas burners or special furnaces for all or each? Does the experience include adequate schooling in engineering and service and sales and management above and in addition to the mechanics of the industry? Is there any inclination to manage and sell, or is the inclination toward the mechanical end of the business? If one or the other, who and how shall the other be managed?

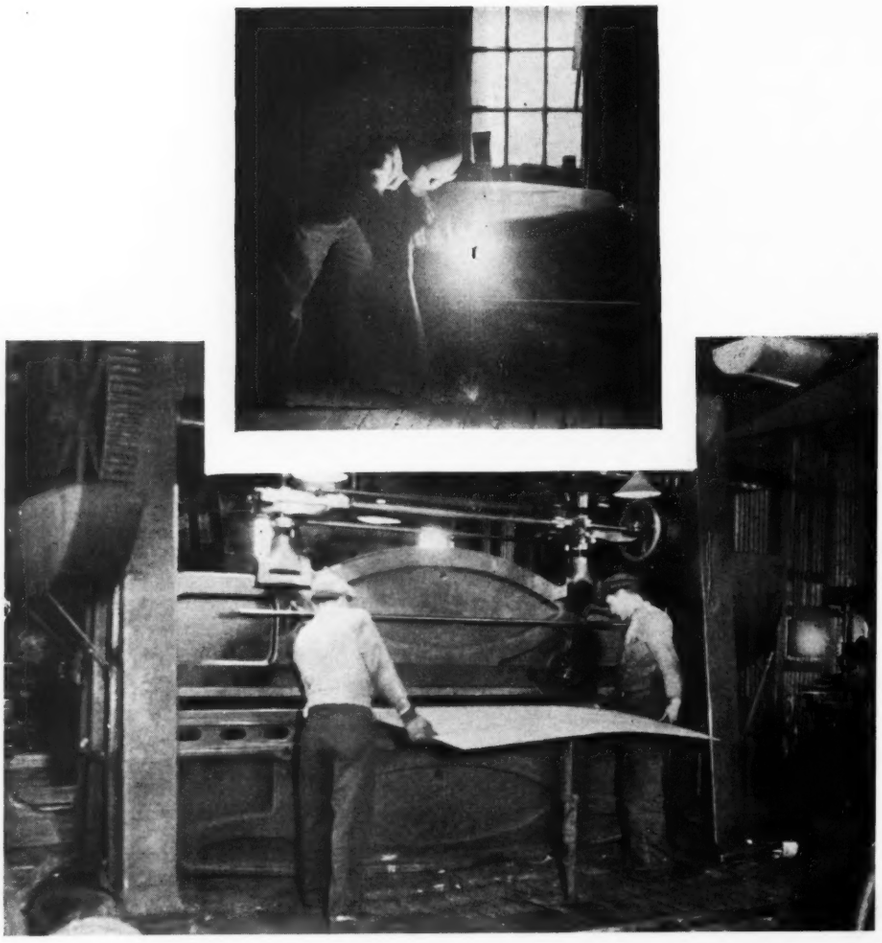
Have the years of apprenticeship and the experience as a journeymen trained for management? Does a set of books mean anything beyond a lot of figures a bookkeeper enters in columns or which our man places in certain ledgers just because someone said —"do it thus and so"? Are the sale campaigns of the competition just a pain in the neck and something to be ridiculed in public and worried over in private or is selling a picture of thousands of people wanting the thing he has for sale and the ways and means of getting them to buy?

Is all the progress in materials, in methods, in machinery, in applications of old and new materials to old and new problems something to thrill over and dig into—or is all this new progress something to be passed by in the rush to finish some inconsequential work which has been done in the same way since the trade began?

Am I going to this school, or read this article, or visit this display of new machines or new equipment? Or is all this taboo because that five feet of gutter just must be hung this week?

Who dares to say that the conduct of business today is simple?

Who dares to think that education in our craft as operated today can ever be anything but unfinished business?



Heavy Stuff

THE telephone beside the desk rings urgently.

A voice on the wire says—"This is Bill Blank of the Blank Sheet Metal Shop. I'm erecting a smoke breaching, but the plate is too heavy for my machines. Can you cut and form the pieces for me by tomorrow afternoon?"

Assuring Bill Blank that the job can be turned out in time, Elizabeth Clayton turns to the gentleman standing at the counter and asks his needs.

"I am Mr. Smith of the Mount Hospital. We are remodeling some of our kitchen equipment and would like to ask about heavy stainless steel—whether or not heavy steel can be formed especially to our kitchen from measurements made on the job."

Assuring Mr. Smith that this can be done, Miss Clayton takes him into the office of the designer for sketches, samples and a full explanation.

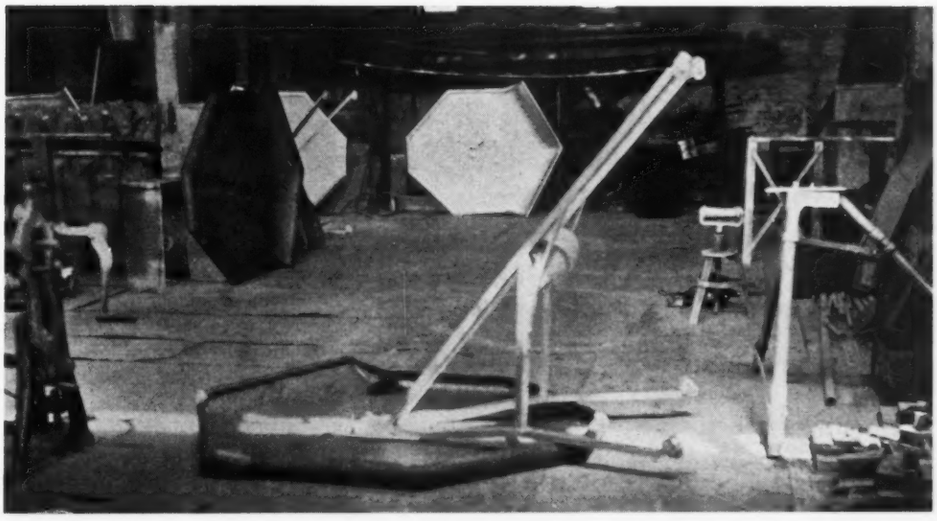
The top letters on the pile from the first delivery is an order for one football machine to be shipped to California, another to Florida, a third nearby in Pennsylvania.

"These football machines have been in regular production in the shop since 1933," she explains. "We helped the designer with his plans so that the machines could be produced at as low a cost as possible, but also that rough treatment would not break up the machine."

Again the telephone. A man asks—"This is Harry Brown. We are running ahead of our shop schedule and can use those sheets and angles you are cutting and forming for the ——— job. Any chance of getting the material to us right after lunch?"

Miss Clayton looks up yesterday's shop time cards and steps out to find that the truck is being loaded. "The order will be at your shop in an hour and a half," she says.

This is an imaginary nine o'clock visit to the Frank B. Clayton shop in Philadelphia. An unusual shop in many ways, but largely because it special-



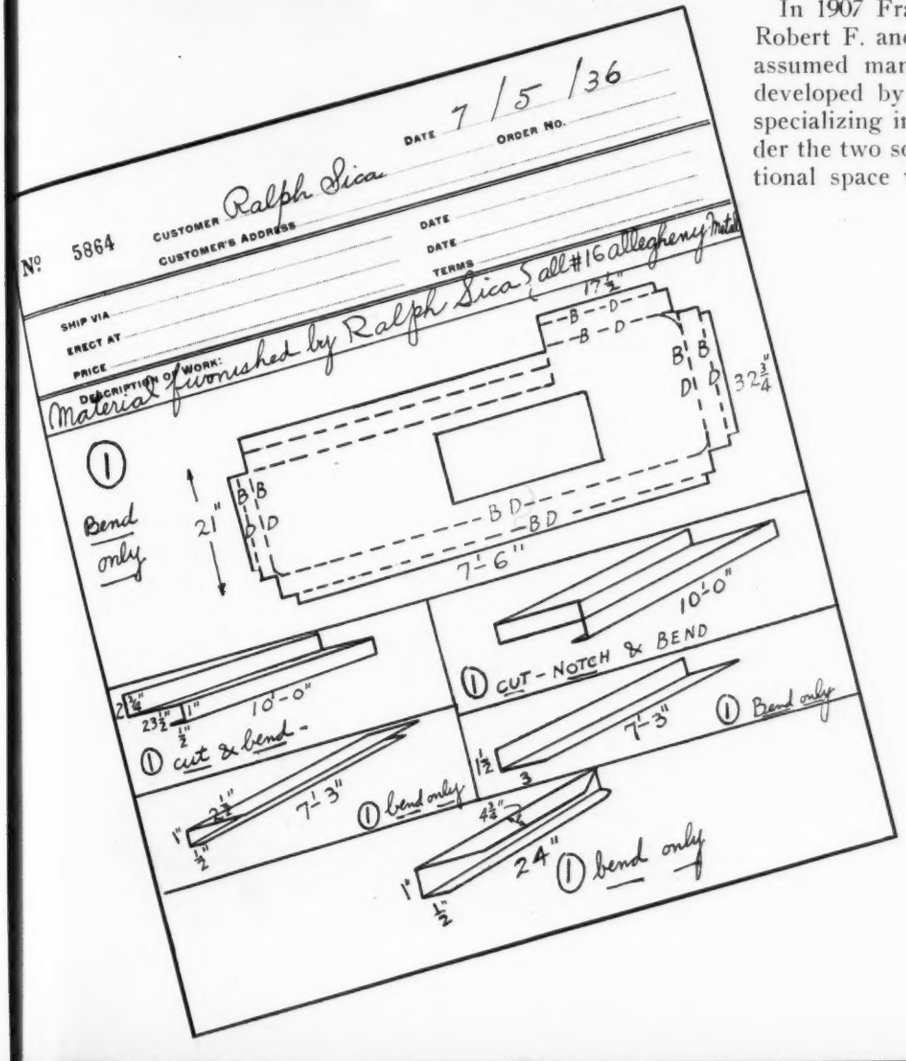
The two photographs on the facing page show welding and forming operations on the football machine. The photograph on this page shows a machine fabricated and welded and ready for application of padding. The shop job card below shows a typical order completely specified for production.

izes in fabricating heavy gauge material—material requiring heavy power equipment. The jobs range from small orders for local shops requiring an hour or two of time, to year round production of specialty items—of heavy material.

In 1898 Frank B. Clayton opened in Philadelphia a sheet metal shop to fabricate light sheet metal work. Hand operated machinery and hand tools constituted his equipment. For the work contemplated, this equipment was adequate and quite satisfactory, but four years later, in 1902, Mr. Clayton realized that there was a need in Philadelphia for a shop equipped to handle work in plate and heavy gauge material. Not only was there a field for such fabrication which the firm could get by contract, but many of the sheet metal shops had fabrication in heavy gauges and neither the equipment nor the experience to complete these contracts.

Accordingly in 1902 Mr. Clayton bought and installed power machinery and began active solicitation among buyers and also among the contractors. So successful was this change in policy that one year later the firm was forced to secure larger quarters and additional equipment.

In 1907 Frank Clayton died, but his two sons—Robert F. and George B.—trained in the business, assumed managership and continued the policies developed by their father. Following the idea of specializing in heavy gauge work, the business under the two sons grew steadily so that by 1912 additional space was required and a building was secured at 1227 North 11th Street, the present address.



In these years before the war, the Clayton shop with its power machinery fabricated the usual heavy gauge items such as boiler breechings, tanks and pans, but found an increasing market for special products. As time went on and new items appeared of metal or older products turned to metal, additional items such as short auto chassis sections, chassis cross members, special bent angle shapes and gear casings were placed in production.

Then, a few years ago, stainless steel was introduced as a material. The Clayton shop found itself in an excellent position to fabricate heavy stainless steel items of a gauge too heavy for the hand or low power equipment of the average sheet metal

shop or even of the manufacturer who did not have facilities to install the large power machinery necessary to fabricate heavy steel.

With experience in fabricating this material and equipment to do the work, the firm has in late years designed and fabricated roll rim table tops, heavy gauge sink and drain boards, stainless steel mouldings. Some of the work in this field has been outstanding in its excellence of design and fabrication and the firm's designer has been kept busy cooperating with producers who require assistance in the actual manufacture of their items.

The football machine referred to is the Crowther Charger, Blocker and Tackler, a football training machine intended to assist in making better linesmen. The machine, shown in various stages of production in the photographs in this article, consists simply of a heavy skid or sled on which is welded a framework carrying padding against which the linesman charges to develop his technique and increase his charging leverage.

These machines were first placed in production in the Clayton shop in 1933 when 22 machines were made. The production, by years has been—1934, 150 machines; 1935, 200 machines; 1936, 125 machines; 1937 to date, 275 machines.

The heavy sled with its turned up, pie crust, edges is formed from heavy plate in the power presses. The framework carrying the dummy is cut, formed and welded in the shop and the whole assembled by arc welding. Suitable benches, jigs, and procedure have been developed to speed production and insure uniformity of the product.

The specialization in work of heavy gauge has made necessary special production management. Work comes from small and large sheet metal shops; from manufacturers of products such as those mentioned, plus the regular items made up to specifications standardized previously. In any one day the shop may handle several small rush orders for a few pieces for small shops, plus several regular production items, plus development work for a new producer, plus preliminary work on items to be completed days or weeks ahead.

To keep close check on time, material and machine operation for such a diversity of work the firm has perfected a method of ticket control requiring a minimum of time and bookkeeping, but leaving no opening for mistakes in the shop.

One of the illustrations shows a typical shop work ticket for a small job in heavy stainless steel. Under the usual entry of buyer's name, address, order number, etc., space is made for shop drawings which enable the machine operators to understand exactly what the buyer wants and what has been worked out between the salesman, estimator, designer and the customer.

Because so much of the shop's production runs to orders which require only a part of a working day, a time clock is used to keep close account of time required. When a mechanic takes out an order he is given a time card which shows the date, order number, designation of the job and the workman's name. This slip is placed in the clock when work begins and stamped at each interruption. Also when the job is finished. The total time from the clock is written in on completion, with items of expense such as car fare, railroad fare, meals, hours traveling and miscellaneous items of expense.

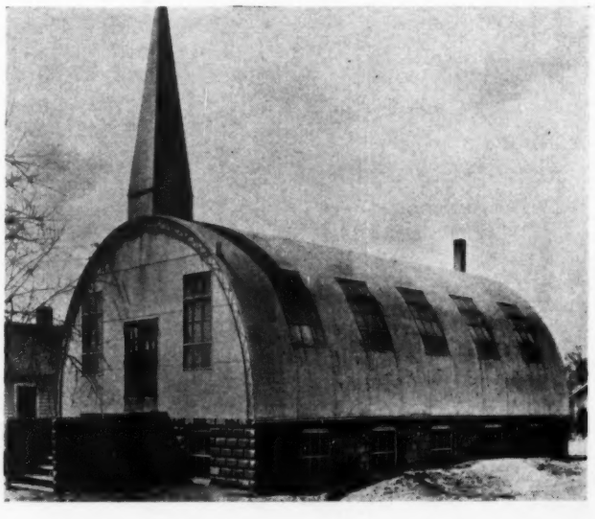
The development of methods for keeping track of work going through the shop; also office records and time and material accounts has been largely under the intelligent guidance of Elizabeth Clayton, sister of Robert and George. Raised in the business, Miss Clayton possesses a full understanding of shop operating problems, and to her knowledge is due much of the smoothness of procedure despite complications due to the unusual basis of operation.

A Welded Church

The church here illustrated in Peoria, Illinois, is believed to be the first church of its type ever built. It is constructed of steel, erected and joined together entirely by electric welding.

To build the church, six half circles of steel plate, shaped in the form of the church roof and fabricated by electric welding with trusses like that at front of church, were delivered to the site and placed on the brick foundation. These sections are those at the ends of the church and between the windows. To complete the roof structure, curved steel plates 3/16-inch thick and 4 feet wide were electrically welded between and to the large sections. The church was built by R. G. LeTourneau, Inc., Peoria, Illinois. Total cost of the steel work, including designing, fabrication and field erection was only $2,000.00.

Details of the project and the photograph were furnished by the James F. Lincoln Arc Welding Foundation, Cleveland. The foundation has set up a fund of $200,000 to study arc welding and its uses.



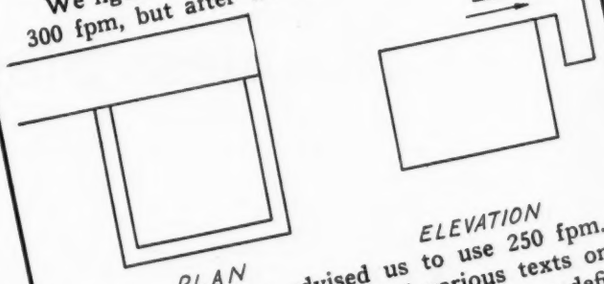
Exhaust for Sulphuric Acid

By J. W. Baybutt
Instructor, Rochester Athenaeum and Mechanics Institute

American Artisan:

We recently made an installation of an exhaust system for sulphuric acid tanks for cleaning metal before plating, and as a hood was impractical, we placed the exhaust outlet over the rear edge of the tank as the drawing indicates.

We figured that we should use a velocity of 300 fpm, but after we had ordered the fan a factory engineer advised us to use 250 fpm. Since then we have studied various texts on exhaust systems and we could not get a definite answer to the question, whether we should have used 200 fpm or 250 fpm as a base. The installation seems to be working all right to date. What would you suggest?



SOME engineers recommend so called slot hoods in preference to the old overhead style in practically every exhaust job. While the overhead hood was probably replaced originally on account of production conditions such as overhead handling materials etc., it has proved its worth in many other ways, particularly in lower cost and greater effectiveness.

There are numerous methods of determining the amount of air to be used with a definite size tank and the slot type hood. We must also, however, be concerned with the problem of where the air is coming from before determining the velocities to be used. Witness Fig. 1. It is easy to see that a tank located near open windows as shown would tend to have a short circuiting of air flow; that is the back of the tank would be well protected, but the front where the operator is primarily interested in good ventilation would tend to be neglected. In such a set up as this probably 250 fpm face velocity would be needed at certain times to guarantee good ventilation if the make up air had to come from the windows. By locating the tank on the opposite side of the room from the windows and the air still to come from the windows a better coverage over the whole surface of the tank would be effected.

In a great many cases 100 fpm velocity has proven satisfactory when the supply air of the same amount has been directed properly. If operating conditions will permit, a supply nozzle should be provided on the operator's side of the tank as shown in Fig. 2. Of course the rate of fume generation could be so tremendous that a large amount of air would have to be handled to provide the necessary carrying

(*Continued on page* 94)

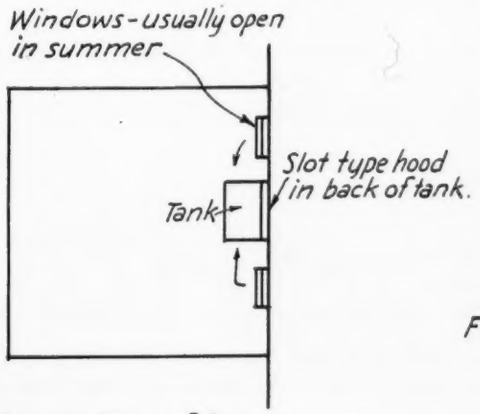


Fig. I Plan of Room

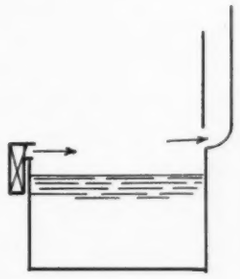


Fig. II Cross Section of Tank

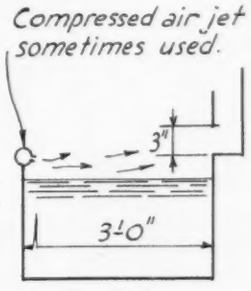


Fig. III Cross Section







Finishing Welds in Stainless Steel*

Polishing Equipment

IF initial rough grinding operations do not leave a sufficiently satisfactory finish, a polishing wheel mounted on a flexible shaft spindle can be used to follow up the grinding wheel after the weld has been ground nearly flush with the base metal.

Polishing wheels should have a soft cushion type of buff, well ventilated to lessen the possibility of overheating. If previously used on ordinary carbon steel or brass they should never be used on stainless steel unless thoroughly redressed, since steel or brass contamination might bring about corrosion.

Many operators recommend changing at No. 180 grit from artificial abrasive to Turkish emery, because it produces a higher polish. It contains some iron oxide, however, which would have to be removed, and many fabricators are therefore using aluminum oxide abrasives, both fused and unfused, for all the operations on stainless steel. Fused alumina will cut faster than unfused alumina as a cutting down and buffing compound.

Abrasive grains firmly glued to the surface of a polishing wheel are often too severe in their action to give the greatest efficiency, since such grains cause hard cutting or gouging. The resultant cuts must be removed in subsequent polishing or buffing operations. Grease is especially important in these polishing wheels in order to reduce the severity of cutting.

To relieve any harsh action that still persists,

*From paper by the same title published in Oxy-Acetylene Tips, May, 1937. Reprinted by permission of Linde Air Products Company.

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Illustrations—Top to bottom—

Buffing the corner and end welds on a stainless steel tank.

Buffing a weld on a large stainless steel milk tank. Shellacked paper protects the metal inside the tank.

Color-buffing a shallow stainless steel tank.

there has been developed a series of special patented greaseless compounds. These contain soft grains in a binder that has the property of adhering to a soft buff as the compound drys, leaving a thin layer of dry abrasive attached to the flexible surface of the buff wheel. The function of such a composition is intermediate between polishing and buffing and in many cases eliminates a great deal of polishing.

In a recent development sodium silicate has been used as a mild binder.

Polishing Technique

In polishing, as in grinding welds in stainless steel, the operator should remember that the metal is generally harder and tougher than other alloys. It becomes hardened by mechanical working and the color and corrosion resistance of unstabilized stainless steel are affected by exposure to excessive heat. The metal has a high coefficient of expansion.

Except for such modifications as are made necessary by the above mentioned properties, the polishing of stainless steel is done much as is the polishing of any other alloy. Care must be exercised to prevent excessive heating; wheel speeds must be controlled; pressure must be controlled; the proper amount and type of lubricant must be used; care should be employed in the selection of buffs and of proper abrasive grain sizes. Table I will be of value in selecting the proper wheel.

Sometimes the first polishing step in Table I is superfluous because of previous fine grinding, and sometimes a final Tampico finish following the No. 120 grit wheel is imparted with a slow-speed Tampico brush. This finish is relatively inexpensive and blemishes are not readily apparent. It is easily applied and gives a smooth silver-gray luster that is very attractive. A good paste for the Tampico brushing operation consists of one part kerosene, four parts No. F powdered pumice, one part lime, and four parts engine oil.

Blending Welded Areas in Polishing

The best results in blending welded areas with the surrounding metal are obtained only when great care has been exercised in the choice of abrasives as well as the correct wheel and portable tool. Whether or not blending is necessary depends upon whether the main surface of the metal has been mill-polished, or whether it all needs to be hand-finished.

When testing to determine the correct grain size, remember that a new wheel may have a disproportionately high cutting rate which will last only a relatively short time. Before using a new abrasive wheel, therefore, always break it in on a scrap piece of stainless steel. Do not select a grit number so fine that the operator will have to do too much work. Such a procedure would cause undue heating of the stainless steel and the expense of extra polishing time. If a deep scratch is to be removed, use a coarser grit at first and finish with the desired grit. Always use the coarsest grit that will produce the required finish.

Let the polishing tool down onto the work with

(*Continued on page 92*)

TABLE I

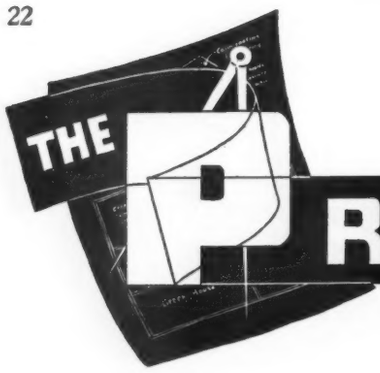
SUMMARY OF RECOMMENDATIONS OBTAINED FROM TWELVE ABRASIVE OR STEEL COMPANIES ON FINISHING STAINLESS STEEL WELDS

(Depending on the type of weld and the finish desired, a selection from these operations is made)

OPERATION	ABRASIVE	GRIT NO.	BOND OR MATERIAL	SURFACE SPEED FT. PER MIN.
POLISHING:				
Rough-Polishing to remove blemishes	Dry alumina	60-80	Muslin or canvas*	6,000-8,000
Greasing	Alumina with tallow or lard-oil	100-120	Muslin	6,000-8,000
Dry Fining	Alumina	150	Muslin	6,000-8,000
Grease Fining	Black emery or alumina	180	Walrus or muslin	6,000-8,000
Grease Coloring (for mirror finish)	Emery or alumina with oil	220	Walrus, sheepskin or felt	6,000-8,000
	Flour emery with oil	to 320	Walrus, sheepskin or felt	6,000-8,000
SPECIAL FINISHES				
Tampico Brush	Pumice and kerosene	.....	Stainless steel wire brush	6,000-7,000
Comb. Polish and Buff	Patented compound	.....	Sewed loose or pocket type of muslin buffing	7,000-7,500
BUFFING:				
Cutting-Down	Tripoli composition	.....	High-count unbleached muslin	10,000-12,000
Color-Buffing	Chromic oxide or unfused alumina	.....		9,000-12,000

NOTE:—The grade or "hardness" of the grinding wheel (not given in this Table) should also be considered.

*Cloth polishing wheels are usually made up with a hide glue.



Your comment or experience is invited.

ROBLEM CORNER

Attic Frost

American Artisan:

In the Problem Corner of your March issue, you had an inquiry from W. B., Minnesota, on the subject of Attic Frosts and your solution to his problem is to heat the attic room.

Of course heating the attic room will eliminate condensation in the attic, but the condensation will take place somewhere else, in other words at the roof boards where the humid or vapor-laden air comes in contact with the cold.

W. B.'s problem is not an unusual problem. This is a problem with which many home owners and building owners are now confronted especially since the present day systems of air conditioning in conjunction with heating are coming to the front.

Even though the attic may be sealed completely from the outside air, you will find that vapor-laden air will pass upward through the ceilings of the second floor, through the plaster and into the attic and when this vapor-laden air comes in contact with the cold attic, condensation takes place and this condensation takes place either at the roof rafters or on the ceiling joists. The result is disastrous as far as the average type of fill insulations are concerned. Most of these fill insulations will absorb moisture and when this condensation is absorbed by this fill insulation, the value of the insulation is materially reduced.

Last fall, I had the privilege of addressing a group of insulation contractors in the East and it seems to be quite general that this question of condensation in attics could be effectively combatted only by complete waterproofing of the ceiling and in the absence of the waterproofing—which generally is the case—by ventilating the attic. This ventilating of attics can best be done with ventilators.

There may be some question in regard to the value of ventilation in attics as far as elimination of condensation is concerned, but one need only make a few comparisons with other methods of eliminating condensation and the answer always is that a movement of air will take care of it. Have you ever noticed that a store window which is covered with frost can be cleared up quickly if a fan directs a constant flow of air against this frost?

You have also seen the small fan ventilators inside of an automobile to take away condensation and frost on the inside of the windows. Likewise, if you drive with open windows in cold weather, you will find that frost does not accumulate. This definitely proves that condensation can be removed with proper ventilation.

Any number of good insulation people recommend the use of ventilators with their insulation.

This question of condensation in attics, is quite a problem and many phases enter into a discussion of it, and it is my intention to discuss this at length with our Sheet Metal Contractors' Association at one of their sessions in the future.

R. S. Schmieder,
Assistant Manager,
Fireproofing & Specialties Div.,
Milcor Steel Company.

Office Cooling

American Artisan:

In your January, 1937 issue you carried an article by M. W. Pehl describing the cooling of a small group of offices with a compressor and a short distribution system. I would like to ask if the water used in the system is recirculated and the condensate allowed to overflow or if the water is taken from a fresh supply controlled by a float?

E. H. Z., Illinois.

Reply by
M. W. Pehl

The water in the tank is recirculated and the moisture that is condensed out of the air is carried off through an overflow to a drain in the floor. The water in the tank is controlled by a hand operated globe valve.

The cost of this cooling unit was a very important factor in the price which had to be kept low, hence no automatic control was included in this system.

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Heat Loss Coefficients

American Artisan:

Please tell me where I can get a handbook for determining heat losses. Does the ASHVE Guide contain this information? Also does the Guide explain how to size ducts for forced air installation? Where can I obtain data showing the relationship between pipe sizes for gravity and forced air work?

W. A. S., Nebraska.

Reply by
The Editors

There are several sources of information for determining heat loss. You can obtain a very complete discussion, by writing a request to the Chief Engineer, The Furblo Company, Hermansville, Michigan, asking him to send you a complete set of Furblo Institute Bulletins. These bulletins are free of charge. The A. S. H. V. E. Guide explains exacty how to determine heat loss. Most of the manufacturers of furnaces or fans have engineering manuals, and all manuals, to our knowldge, contain instructions for determining heat loss.

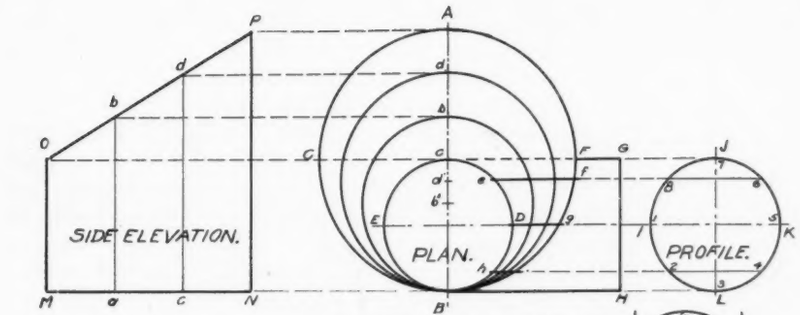
In answer to your last question, there is no relationship between sizes of ducts for forced air as compared to gravity pipe sizes. The method of determining pipe sizes is entirely different for gravity and for forced air, and the factors considered in sizing pipes are entirely different in both cases.

To determine pipe sizes for gravity we recommend following the Gravity Code and enclose a copy.

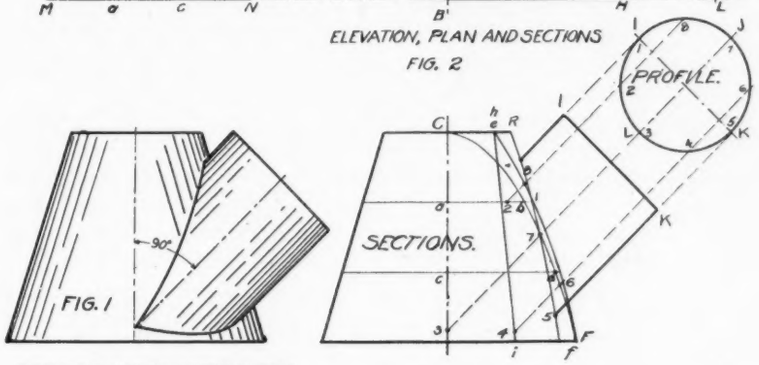
For determining pipe sizes with mechanical circulation, we recommend, first, the equal friction method outlined in the Guide, and secondly the new mechanical heating code prepared by the National Warm Air Heating and Air Conditioning Association, sold for fifty cents a copy. If you want a copy send your order to Allen W. Williams, Managing Director of the above association, A. I. U. Tower, Columbus, Ohio. We recommend as the third method, the third Edition of the Mechanical Heating Code and enclose a copy.

Scalene Cone Intersected by a Cylinder, Obliquely

By L. F. Hyatt
Canton, Ohio



ELEVATION, PLAN AND SECTIONS
FIG. 2



SCALENE CONE INTERSECTED
BY A CYLINDER ON AN ANGLE, OBLIQUELY.

FIGURE 1 represents a frustrum of a scalene cone intersected obliquely by a cylinder, their axes lying in different planes. The view here given is that of the vertical side, thus enabling us to show the angle of the cylinder and the slanting sides of the scalene cone.

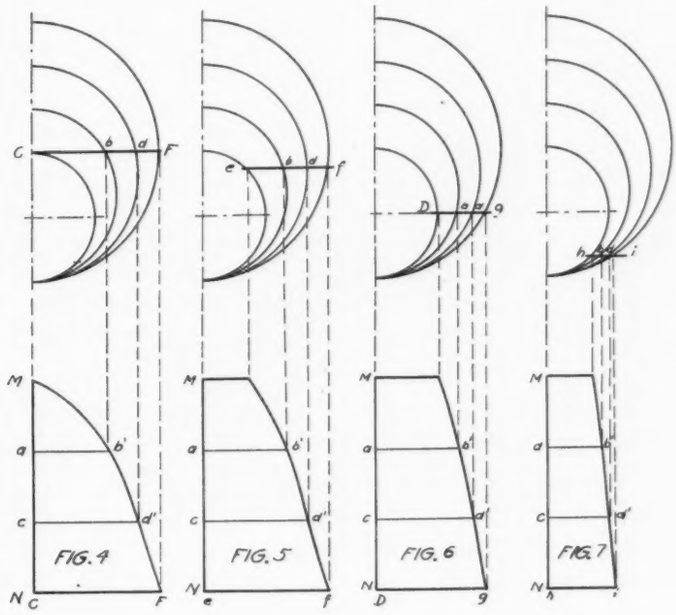
In Fig. 2 are shown the elevation, plan, and section views of the above problem. Begin this problem by first drawing the center line *A-B* and then the circle representing the plan of the frustrum of the cone at its base. Now draw the circle, *C, D, B, E* representing the top of the scalene cone. The intersecting cylinder is represented by *F, G, B, H*, the profile of which is indicated by *I, J, K, L*.

Now project a line to the left of point *B* on the plan and upon it step off a distance representing the height of the scalene cone *M-N*. From these two points erect lines perpendicular to *M N* and also project lines from points *A* and *C* on the plan, intersecting the lines just drawn, thus locating points *O* and *P* of the side elevation.

Divide the profile *I, J, K, L* into eight equal parts indicated by the numbers *1* to *8*. Since the points in the cylinder lie in four planes, *7, 8-6, 1-5* and *2-4*, it will be necessary before finding the line of intersection to construct four vertical sections, *C, F, e f, D g*, and *h i*. In this case point *3* requires no section, since it is flush with the vertical side.

To obtain the desired sections divide *M N*, side elevation, into three equal spaces and from *a* and *c* erect perpendicular lines intersecting *O* and *P* at points *b* and *d*. From these points draw horizontal lines intersecting the center line *A* and *B* of the plan at *b* and *d*. Now with *b'* and *d'* as centers draw circles, thus forming sections in the plan corresponding with the *a, b* and *c, d* in the elevation. The four sections above are shown in the sections view below *C F, e f, D g* and *h i*, but to avoid confusion, as would be the case if all the lines were projected down from the plan view, Fig. 3, Figs. 4, 5, 6 and 7 have been drawn.

Begin by drawing the four half plan views the same as in the plan view, Fig. 2. Extend the vertical diameter and step off the distance *M, a, c, N* found on the side eleva-



tion view, locating the distance *M, a, c, N,* Fig. 4. Draw the horizontal lines *a-b, c-d* and *C-F* of indefinite length. Now drop lines from *b* and *d* locating points *b'* and *d'* and *F* of the section. Draw the curved line through each of the points, thus producing the true shape of section *C, F. C* and *F* may be extended so as to be the line on which the distances *e-f, d-g,* and *h-i* may be stepped off in obtaining the other three sections. These are, of course, done in the same manner and will require no further explanation.

These sections are now transferred to the section views, Fig. 2.

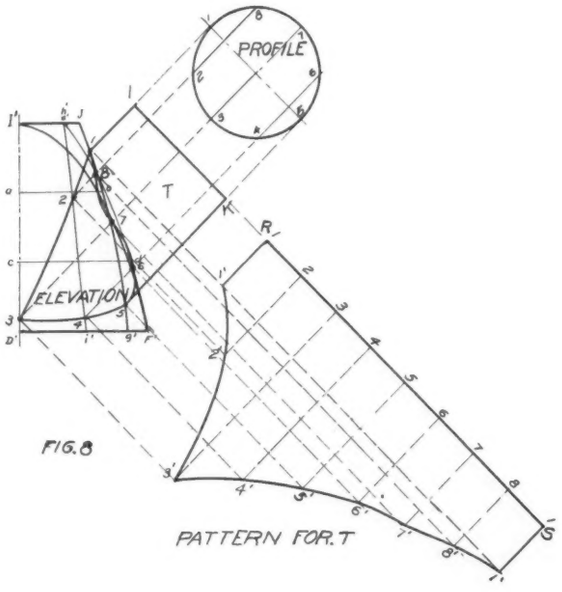


FIG. 8

The distance *a-b'* found on Fig. 4 is stepped off from the center line on the section views locating *a, b.* Next *c-d'* from Fig. 4 is also stepped off on the section view Fig. 2, locating points *c, d.* The curved lines drawn through these points will duplicate this section in Fig. 4. The same procedure is followed for the other sections in transferring them to the elevation view, Fig. 2.

Elevation View

Next draw the elevation view of the cylinder, numbering the points on the profile so as to correspond with the points on the cylinder of the plan view. Lines are carried from *I, J, K, L* on the profile against the profiles *C F, e f, D g* and *h i* as indicated by the small figures *1, 2, 3, 4, 5, 6, 7, 8.* A line drawn through these points would give the line of intersection between the cylinder and the scalene cone. This line is omitted on this view, but is shown in Fig. 8, which is a duplicate of the half of the scalene cone intersected by the cylinder. This figure was drawn to show the method of drawing the pattern for the cylindrical pipe.

The parallel line method is used here after the elevation view is drawn and numbered as was the elevation view, Fig. 2. The line of intersection is also drawn. The line *I K,* Fig. 8, is extended indefinitely and lettered *R S,* and upon this line is stepped off the distances *1* to *8* found on the profile view of the cylinder. From each of these numbers, measuring lines of an indefinite length are drawn at right angles to the line *R-S.* Next draw lines parallel to *R-S* from each of the points *1, 2, 3, 4, 5, 6, 7, 8* in the elevation view, Fig. 8, allowing them to intersect the measuring lines of like numbers at *1', 2', 3',* etc., through which the curved line describing the outline of the pattern is drawn.

Next draw the plan and elevation views, Fig. 9, as shown by *M, N* and *O, P* in the plan and *a, b, c, d, e, f, g, h, i.* Now draw lines from each of these points on the plan to apex *A.* Also erect perpendiculars from each of these points on the plan view, allowing them to intersect the base line *N-P* of the elevation view of the cone, and from each of these points just located draw lines to the apex *X* of the elevation view. We now have the plan and elevation of the scalene cone.

Next we will explain the method of finding the true length of all the lines running from the base to the apex of the scalene cone, Fig. 9. Begin by drawing the outline of the plan and elevation view, Fig. 10, just as was done in Fig. 9. Divide this plan view as before and letter points *a', b', c', d',* etc., and as before draw lines from each of these points to apex *A'.* Now with radii equal in length to the distance from each of these points to the apex, strike arcs, allowing them to intersect the horizontal center line as shown. Again erect perpendiculars from each of these points, allowing them to intersect the base line at *a', b', c', d'.* Now draw lines from these points to the apex *X'.* A comparison of the length of like numbered lines in Figs. 9 and 10 will show a difference in length, the lines of Fig. 10 being the longer and, of course, the true length lines.

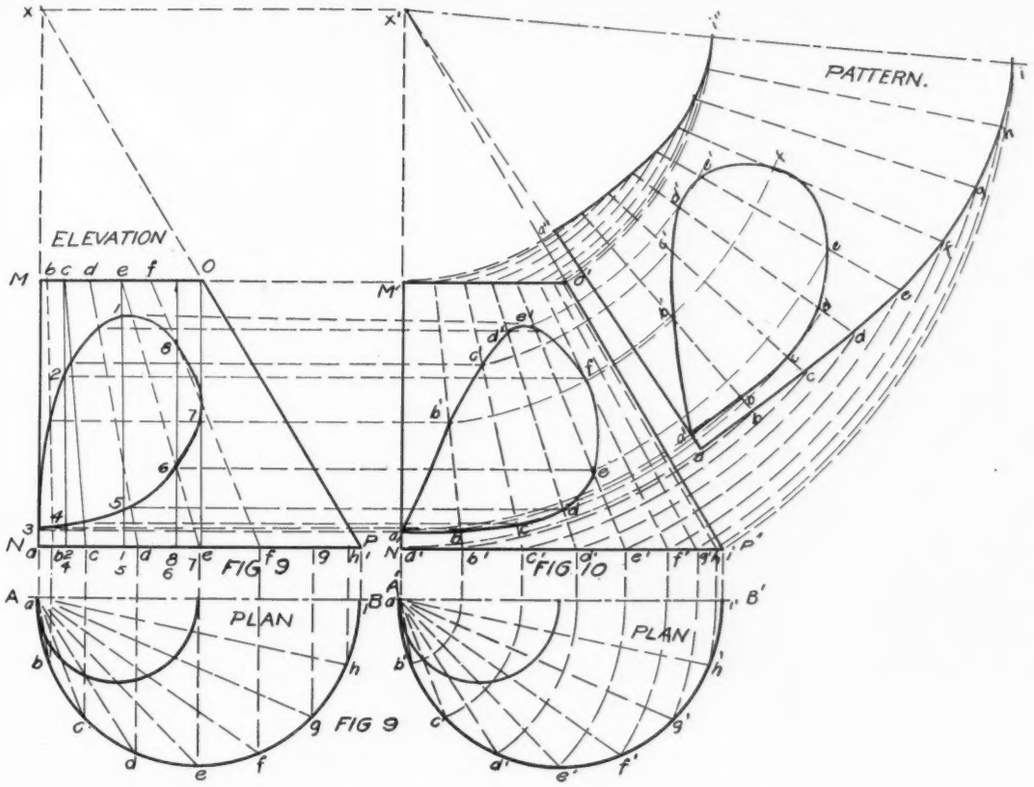
Cylinder Opening

Before beginning the pattern for the frustrum of a cone it is necessary to obtain the opening in the side elevation view *M, N, O, P,* Fig. 9. This side elevation view is the same as shown in Fig. 2, and the vertical lines drawn are designated by the small figures at the bottom. They are the lines of vertical sections obtained in Figs. 4, 5, 6 and 7 and are equal in number to the divisions in the profile, Fig. 1.

The opening in the elevation is found in the following manner: Upon the line numbered *2, 4* at the bottom of Fig. 9 step off the vertical heights of points *2* and *4* found on section curves, Fig. 8. Also step off on line *1-5* the vertical height of *1-5* found on *J' g'.* Now take points *8* and *6* from *e'-F',* and point *7* from *I'-F',* thus locating all of the points of the opening. A line drawn through these points will give the opening. It is not necessary to show this opening in the plan view, since it is not used in developing the pattern.

Cone Pattern

We may now proceed with the development of the pattern of the envelope of the scalene cone. First it is necessary to locate points corresponding to the points representing the opening on the plan view. From the points *1, 2, 3, 4,* etc., on the elevation view, Fig. 9, project horizontal lines allowing them to intersect lines of like number, Fig. 10,



as shown by letters *a' b', c'*, etc. After all points are located in true distance from the base, we have drawn the outline, which is not necessary, but may aid in visualizing the problem.

To develop the pattern begin by striking arcs using apex *X'* as a center and distances to each of the points on the base line *N'-P'* as radii. These arcs are of an indefinite length. Do likewise with the points on the top of the scalene cone *M' O'*. First locate point *a* of the pattern, which may be any distance from Fig. 10 and with a radius equal to any of the spaces found on plan view, as *a* to *b*, *b* to *c*, or *c* to *d*, Fig. 10, and *a* as the center, strike an arc intersecting the large arc from *b'*, then with the same distance and *b* as a center, strike an arc intersecting large arc from *c'*, thus locating *c* on the pattern; then with *c* as a center, strike an arc intersecting the arcs from *d'* as a center, locating *d*. Continue in like manner with all the other letters through *i'*. Draw curved line *a-i*, describing the outline of the base.

From each of these previously located points draw lines to apex *X'* and then draw the curved line *a"-i"*, showing the outline of the top of the pattern. To find the true distances to each of the points of the opening, project each of the points *a, b, c*, etc., and *a', b', c'*, etc., in Fig. 10. Allow these projects to intersect the hypotenuses of corresponding letters in the diagram of true length lines, thus locating the points of the opening.

Now with *X'* as a center and the pencil point of the compasses successively on points *a, b, b', c, c'*, etc., draw arcs cutting the radial lines in the pattern of like letters and trace a line through these points as shown, thus producing the required shape of the opening of the pattern.

Depth and Marking Gauge

There are many occasions in the use of the two-foot rule about the shop where a removable depth or width gauge attachment would be a very handy application. Homemade devices of tin or sheet metal are of little use due to the lack of any temper in the material.

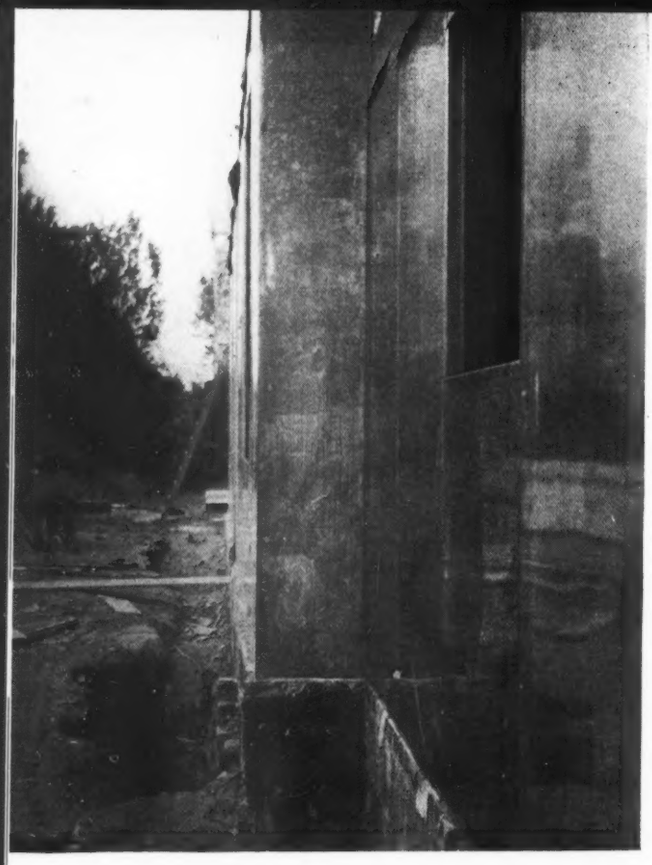
A common inexpensive glass partition clip can be readily altered by the removal of one of the clip projections as shown above to the right, and thus afford an excellent gauge attachment for the rule. The clip fits neatly over the rule with sufficient extension to the side of the stick to squarely contact the surface measured or about the circumference of the hole. The flat portion at right angles to the part on which the clip remains affords a good finger grip or contact for moving the gauge up and down.

The metal of such clips indefinitely retains its spring qualities, and the width of the top is exactly right for fitting the usual rule. The device can also be readily used as a marking gauge by holding a pencil point to the end of the rule.



Glass partition clip attached to ordinary rule makes handy gauge.

Prefabricated Copper Houses



AN interesting development in prefabricated, metal houses has been in progress recently in the east, where, in Maryland, Connecticut and Washington, D. C., Copper Houses, Inc., a subsidiary of Chase Brass and Copper Co., has been licensing builders, architects and home owners to erect the type of prefabricated metal house shown in the photographs. The original development work of the idea was done by John J. Whelan, Washington architect.

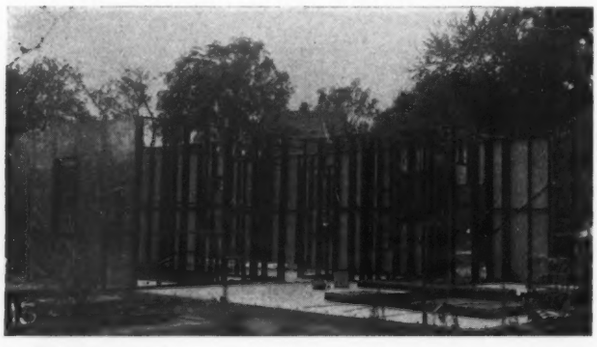
The basic principles include a house without any basement—although a heater room or partial basement can be used—a structural steel frame formed from light weight, fabricated shapes, a copper exterior wall and roof, metal partitions and warm air, winter air conditioning.

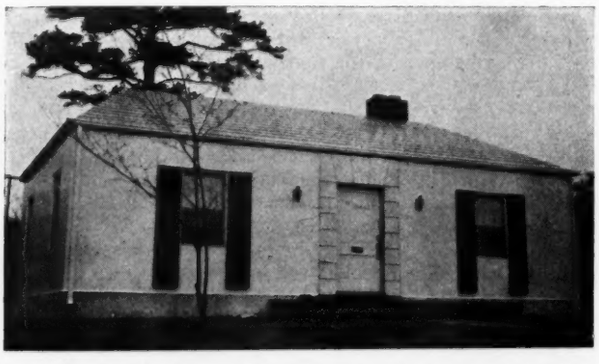
The foundation is built up of block or monolithic concrete in the regular manner. Upon the foundation fabricated floor trusses are placed and bolted to the steel sill plate. Fabricated (Republic Steel) studs are placed at 1½-foot centers as shown in the drawing. The studs which support the center of the wall panel are single channels—the studs at the edges of the panels are two channels, back to back. Partitions are made of the same materials with steel sheets as the panel covering material in place of copper. Roofs may be flat or pitched, as desired, the roof being built of light channels from plates laid across the studs.

The most interesting part of the house is the exterior panel. These panels are prefabricated in the shop and delivered to the site ready for erection. Each panel is built up as a sheet of 1-inch rigid insulation board covered on the exterior and the edges with a 16-ounce copper sheet. The copper is turned around the four sides of the insulation board and onto the back side of the board far enough to give a strong clasp to the copper. The four edges of the insulation board are reinforced with small square pieces of lumber which forms a wood frame and a strong edge around which to turn the copper sheet.

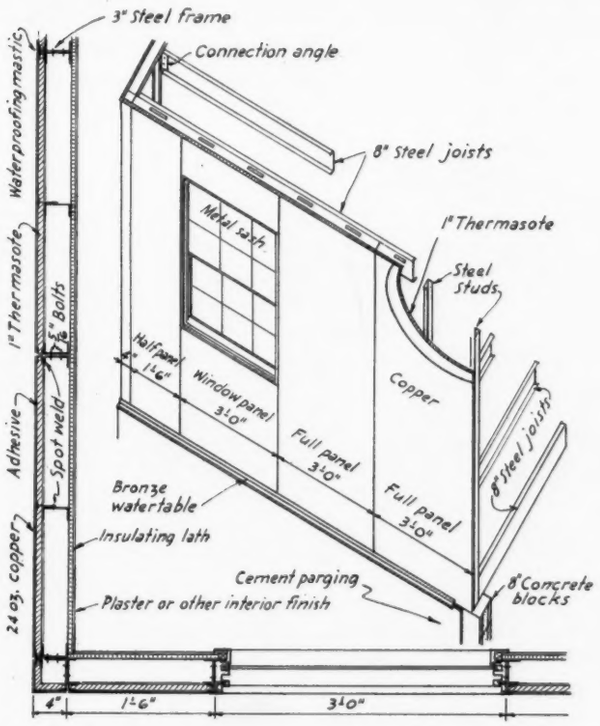
The panels are furnished as full width panels, 36 inches wide and one story high; half panels, 18 inches wide and one story high; door panels with the door frame fabricated into the panel in the shop ready to hang the door and the wall above the door frame already finished; window panels with bronze sash pre-installed and water-proofed; corner panels formed as shown in the drawing of details.

The panels are specified by type according to the plans and when delivered are ready to be bolted in place. The joints between panels are filled after





The picture at the top shows one of the copper panel walls after erection. Note sheen of the copper. At the left, below—a steel frame ready for the exterior wall panels. Members are pre-fabricated. Right—exterior of a finished house with white paint on the copper and a slate roof.



Detail of exterior wall construction showing method of placing panels on frame; hollow wall, later insulated; inset window frame; and corner construction.

erection with waterproof mastic covered with adhesive.

The appearance of this type of wall is shown in the photographs and the drawing. In practice, the copper sheet of the wall exterior is covered with red lead as a paint primer, followed with successive coats of exterior paint, or the metal can be covered with stucco or plastic paint or can be left in the copper to form a natural patina or treated with artificial patina solution.

The roof construction is also worthy of attention. Where the roof is pitched, a special section has been developed which is formed to act as a combination hanging gutter, flashing and eave closure and fastens the wall panels to the roof. If the pitched roof is shingle, the shingles are cut in a continuous strip which runs from end to end. The strips, cut shingle style, are then laid from eve to ridge as in common practice. Standing seam roofs are laid according to standard practice for light weight copper on paper roofing.

These panel and roof constructions are assembled on the foundation by bolting to sleepers in the concrete. The inside surface of the exterior walls may be metal, or plaster or insulating board as specified. The 3-inch hollow wall thus formed is filled with insulation from foundation to eave. Where the wall panel rests on the foundation, any unevenness in the concrete is grouted up and a bronze watertable strip is forced into the joint to make the connection waterproof.

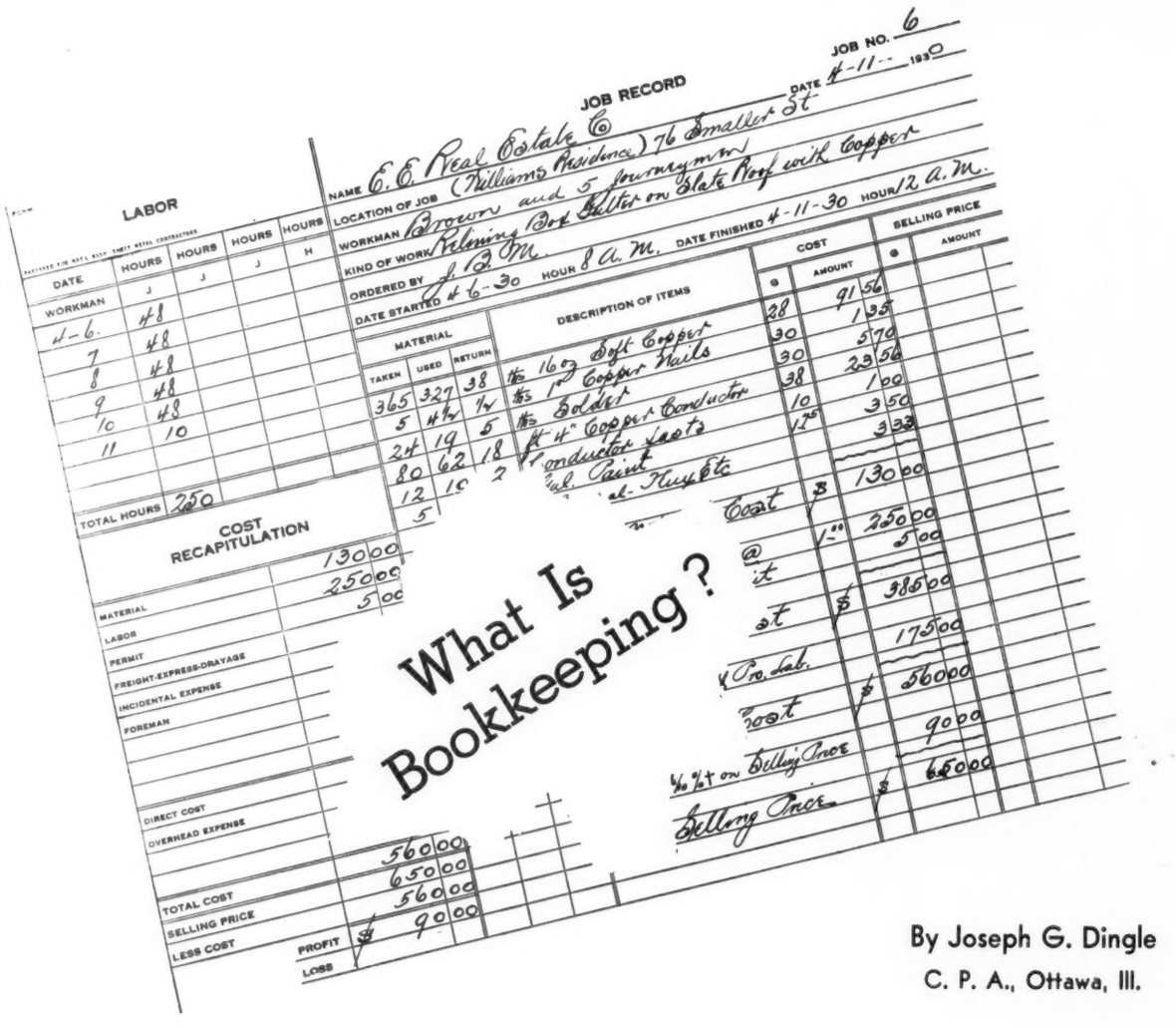
In a Washington, D. C., suburb a builder has erected a row of these houses. Part of the development is shown in the photographs. These houses are one-story and one-and-one-half story types with pitched roofs of metal, asphalt shingles and slate, and are painted white (smooth and pebbly); and all houses have warm air, winter air conditioning. During development these houses were demonstrated in the bare copper, with the red prime coat, and with successive color coats.

The warm air system is interesting in that none of these houses has a basement, so furnaces are located in the kitchen. All units are gas-fired, forced air. The houses have been laid out so that the furnace and the registers are just a few feet apart. Registers in second-floor rooms are mostly served by risers which go straight up. The complete heating system is so compact that the entire plant can be delivered in one small truck.

Architect Whelan and Copper Houses believe that these homes can be erected in small groups at a cost equal to ordinary cheap construction of the same cubage. For single dwellings or very small groups, the cost will be about equal to well built brick.



This row of prefabricated copper houses is in Bethesda, a Washington suburb. Houses vary in type, size and exterior finish.



What Is Bookkeeping?

By Joseph G. Dingle
C. P. A., Ottawa, Ill.

"The art or practice of keeping, as in account books, a systematic record of business transations."

THUS Webster defines bookkeeping—clearly, concisely and to the point. The practice of keeping a systematic record of business transactions. Notwithstanding the simplicity of the definition, there are thousands of business men who have never taken the few minutes necessary to read this definition, and, frankly, there are thousands who refuse to believe that bookkeeping is necessary to their business. They proceed on the theory that if they have enough money in the bank to meet their most pressing needs they are getting along all right. They don't realize that if they had better records pertaining to their business transactions, they would probably have more money in the bank; would owe less to their creditors; and would be able better to cope with the changing conditions in the business world.

A tragedy could be written when a typical small business man hires a bookkeeper. Recognizing the need for such a person in his office, he proceeds to look over the bright young men and women available for the small price he thinks he can afford to pay. Out of the lot, he selects one who appears to possess the best qualifications, and the tragedy begins to unfold. That boy or girl may have had bookkeeping at high school, or may even have had a bookkeeping course at a business college. The employer does not realize that at school the subject of bookkeeping is taught as a general subject—not specifically as it applies to his own business. He fails to recognize the fact that perhaps his own method of bookkeeping is out of date, or incomplete, and quite unlike anything taught in the schools. He blindly proceeds on the theory that he has some books; that he has hired a bookkeeper; and that everything is now all right.

In order that we may best bring out this point, we shall present an actual experience. A certain business man, who, by the way, is a good merchandiser, was quite fortunate in his selection of a bookkeeper. He found a rather unusual type who saw that the record of his business transactions were systematically recorded. She was capable and quite ambitious and kept the books—such as they were—in such a manner as to require little attention from

the employer. Finally, the right young man came along and our bookkeeper became a bride.

There was a bright and capable girl in the store who frequently helped out with the office work so when the bookkeeper resigned, this girl was given the job. The old bookkeeper showed her some of the work, but did not cover the entire field. The employer, acting on the theory that everything was all right, neglected to see to it that the new girl was properly and completely instructed in her work. The result was that while the business continued in its normal course, the books failed to function and many important transactions were omitted from the records. The new bookkeeper, not being fully aware of the requirements, was blissfully ignorant of the failure of the books to record all necessary transactions and finally, when it came time to close the books for the year, the employer found that something was wrong; that his books were not complete.

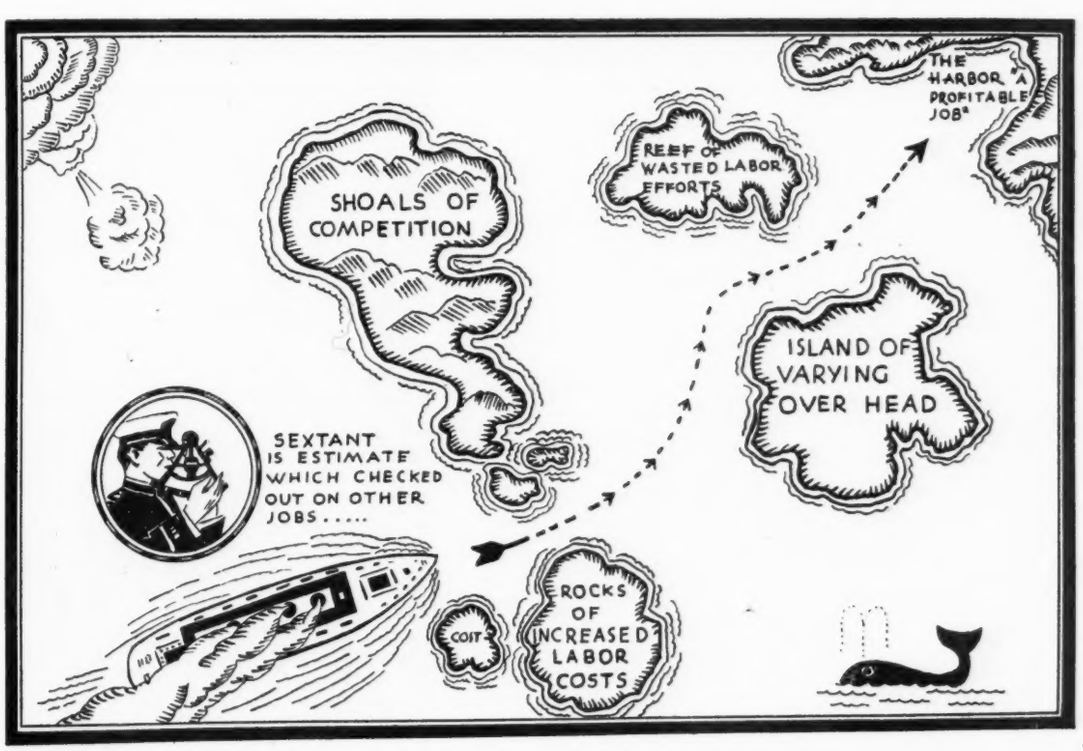
He, then, made another typical mistake. He, knowing but little of the art of bookkeeping, undertook, in his spare time, to help the young lady straighten out the mess. This, as usual, resulted in little progress so far as the books were concerned, but did have the effect of causing the young lady to feel quite disgusted with herself and the job. Finaly, the books were turned over to an accountant, who quickly ascertained the cause of the difficulty, supplied the missing data and was able to properly close the books. As a part of his duty, the accountant explained the work to the bookkeeper, and she is now in a position to carry her responsibilities.

Aside from the fact that this business man lost for a time the benefits of his bookkeeping data, he came very near losing a valuable employe, and, had the young lady quit her job in the state of mind she was in, it is quite likely she should have never again attempted to do office work. As it turned out, the employer now has a much more valuable bookkeeper, and the young lady is an enthusiastic worker, happy in her work.

Business Men by Accident

Many business men became business men quite by accident—rarely by training in all the various branches of the business. A son succeeds his father in the business, and quite naturaly feels that having worked with his father for some time he knows all about every angle of the business. But does he? He knows the merchandise by sight; he knows the prices of the different items; he may know the sources from which the various items are obtained. But does he know all the ins and outs of the entire business? Does he know the relation of his sales price to his cost of merchandise? Does he know the vital relationship between his expenses and sales volume? Does he fully recognize and appreciate the fact that a proper set of books can and must obtain current data covering the progress, or lack of progress made? Does he realize that by keeping his books according to a well established and generally adopted plan, he can from time to time compare his operating results with the results obtained by others in his line of business and thus be enabled to measure his success or failure with that of others?

And, above all, does he realize that by thoroughly understanding the many phases of his business, his financial success is made more certain; his ability to train and utilize his employes enable him to make substantial contributions to his particular industry, and to the success of his employes. And, in times such as are facing the business man today, fortunate



is the employer who has a good business organization; good, loyal employes who fully recognize and appreciate the close relationship between employer and employe. That neither can well succeed without the other, and that only by close attention to their duties, each in his own field, can the business weather the storm of changing conditions and be able to continue its course when at last the quiet and peaceful days return.

A systematic record of the transactions of the business—in other words—good bookkeeping—is a vitally essential feature of every business. These transactions involve, fundamentally, just four things. Buying, selling, receiving and disbursing money. Of course, in each particular line of business, these four classes of transactions will be broken into several subdivisions, and the transactions segregated in such a manner as to produce timely and usable data concerning the business activities. Each particular business should have its bookkeeping custom tailored, to fit the peculiar conditions, yet, in the end, the plan of accounts should conform to a more or less standard program. A suit of clothes consists of Coat, Vest and Trousers, but each man requires a suit of certain size, with more or less variation as to length of sleeve, length of trousers, but, after all a coat, vest and trousers. Every business likewise requires a general ledger, a customers' ledger, journals of several kinds, but one business will require special accounts to contain specific data not perhaps found in like establishments.

Many conditions exist today which require new and detailed records. The Federal Income Tax Acts made it necessary for business men to keep better records, and yet today, 24 years after the Income Tax became a reality there are many business men who have to guess at their income. While it is quite reasonable to predict that in a few instances, these guesses understate the taxable income, it would be our guess that in a far greater number of instances the business man who guesses at his income pays too much Income Tax.

The Federal Social Security Act is requiring detailed and accurate accounts with each employe. Many of the States now have Unemployment Compensation Acts, which require detailed data concerning all employes' wages, hours worked, etc. The Federal Labor Relations Act is another new statute requiring records to be kept and, in many cases, the Robinson-Patman Act is going to give trouble to those engaged in interstate business. Price differentials may be safely made only where it can be shown that such differentials are due to cost differentials.

What Bookkeeping Should Be

Bookkeeping, then, is, or rather should be, a systematic recording of the transactions of the business in such a manner as to produce accurate and usable data concerning the operation, and financial position at frequent intervals. Bookkeeping costs money and is an overhead expense, but there is no part of the business expense which will produce the financial return good bookkeeping can and will produce. Good records, well kept, and intelligently used by the management pay big dividends.

Sheet Iron Brazier

HOLLYWOOD picture corporations, when shooting "on location," use an interesting coke-burning brazier. These efficient heaters are constructed of medium gauge iron with welded joints. Angle frames suspend the fireboxes above the ash tray and thus ensure a strong draft—regardless of the direction of the wind. This design also permits the upper half of the firebox to hinge back—for quick fueling..

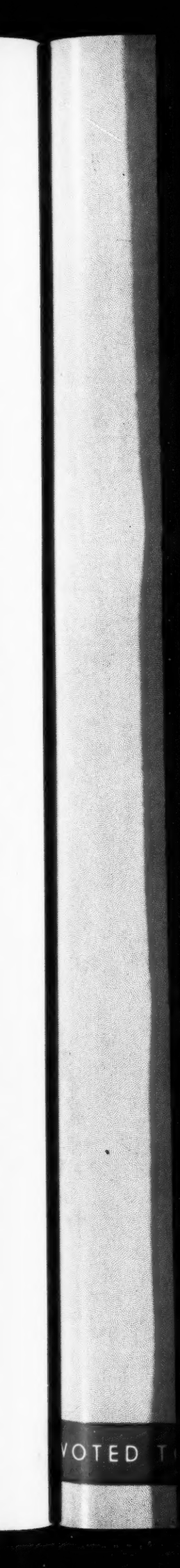
A picture official says: "These outdoor stoves emit a powerful heat. Three or four of these sheet metal units are sufficient to warm up a cast of about 100 technicians and players."

This photo, snapped on the set of "Stolen Harmony," shows two actresses—Grace Bradley and Goodee Montgomery—looking very happy and attractive in the glow from the red hot iron.

There are, of course, many industrial applications for such a satisfactory type of portable outdoor stove. General contractors, utilities, municipal projects, fisheries, etc., employing outdoor crews would find it vastly superior to ordinary make-shift braziers which are usually wasteful of fuel.

Sheet metal contractors will find the units easy to cut out and weld—from the Hollywood pattern pictured.




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RESIDENTIAL AIR CONDITIONING SECTION

THIS issue will be particularly interesting to readers doing cooling.

- - - There is Konzo's concluding article on fundamental principles of night air cooling. Also the concluding article on design of well water cooling systems. Another article explains how a suite of offices, directly under the roof, is cooled by straight air ventilation. A residence cooled by drying with gas, coupled with well water cooling, is presented. An industrial office cooled with well water is explained in detail.

- - - And as a concluding article all the formulas required for calculating cooling loads are presented.

- - - Readers who have followed the Air Conditioning Section during the past four months have been given a comprehensive variety of cooling articles covering all methods of cooling, detailed and short cut methods of engineering and a variety of types of systems.

WATERLOO

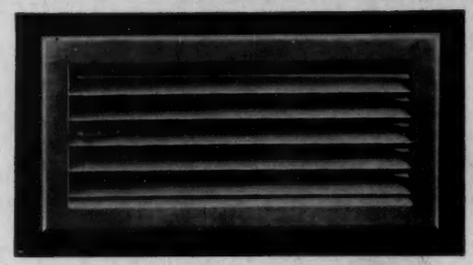
Air Conditioning REGISTERS

More Features — More Sales

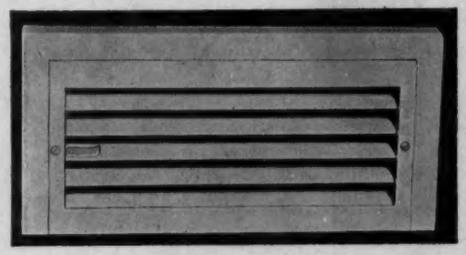
—Waterloo's smart-styled 'Registers of Tomorrow'

Waterloo dealers are cashing in on the sustained, steadily increasing popularity of these ultra-modern "Venetian blind effect" registers. Architects, builders, home owners recognize their distinctive beauty and structural advantages—and are specifying them for new homes and modernization jobs. For, besides distinctive straight-line design that fits today's building ideas, Waterloo Air Conditioning Registers alone provide such features as—

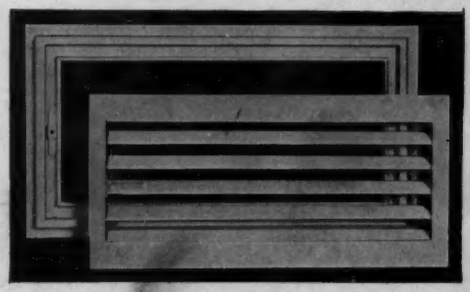
Slanted louvres which reflect light and color, conceal the ducts—Complete adjustable control of air flow (90-degree range) — Positive lock mechanism — Tested capacities.



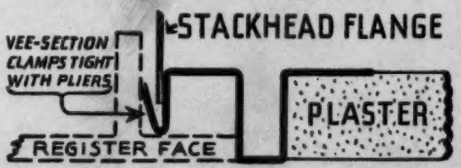
FH-100—Adjustable one-piece Venetian Type Register for walls.



FHD-204—Two-piece Venetian type adjustable Register for baseboards.



FH-102—Venetian Type adjustable Register for walls, with Vee-U plaster frame.



The Waterloo Vee-U Frame assures positive, tight connection with stack-head.

Waterloo Register Co.

Floor Registers . . . Floor Cold Air Faces
. . . Baseboard Gravity Registers . . .
Wall Registers . . . Oakwood Faces
Steel Grilles . . . And All Furnace Supplies

Waterloo, Iowa • Seattle, Wash.

In New York City—Air Conditioning Utilities, Inc., 8 W. 40th St.

In Los Angeles, California — Waterloo Register Co., 824 Claaten Street.

MAIL THIS COUPON NOW!

Waterloo Register Company
(Address nearest office or agency—see list above)

Send new catalog of Waterloo Registers, with new designs, new charts and installation data—without obligation.

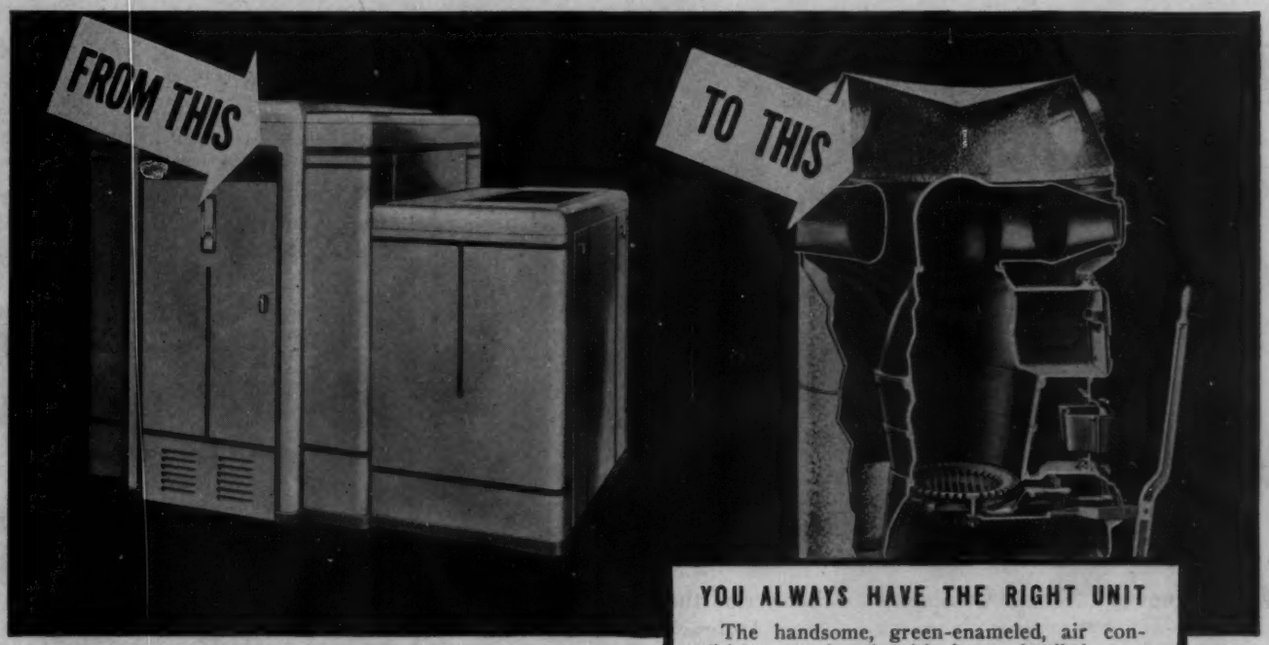
Name .....

Firm .....

Address ..... City .....

SUNBEAM

GIVES YOU EVERY TYPE



YOU ALWAYS HAVE THE RIGHT UNIT

The handsome, green-enameled, air conditioner equipped with integral oil burner (left) and the cast iron gravity furnace (right) indicate the completeness of the SUNBEAM line which includes 4 series of gravity furnaces and 8 series of air conditioners.

IN SUNBEAM'S most complete line of heating and air conditioning equipment, SUNBEAM dealers have the right unit properly priced for every job they are trying to sell.

Whether the prospective buyer prefers to burn coal or oil or gas, the SUNBEAM dealer can offer units designed for that particular fuel. For small homes there are dependable SUNBEAM Furnaces and Air Conditioners of moderate capacity priced surprisingly low. For larger, more expensive residences there are efficient, attractive SUNBEAM Air Conditioners, of ample capacity, that will provide automatic operation at competitive prices.

There are cast iron and steel furnaces in fire pot sizes from 18 inch to 34 inch (pipe or pipeless types) . . . also, Air Conditioning Units that cover every need. Two of the oil burning models come equipped with integral, co-ordinated oil burners.

Both furnace and air conditioning lines have series especially designed for the burning of gas, oil and coal (including stoker and hand-fired models). Return the coupon for complete SUNBEAM data.

THE FOX FURNACE COMPANY, ELYRIA, OHIO
Division of American Radiator & Standard Sanitary Corporation

SUNBEAM
WARM AIR FURNACES AND AIR CONDITIONING UNITS

The Fox Furnace Co.,
Elyria, Ohio.

Please send catalogs covering SUNBEAM Furnace and Air Conditioning equipment; also the name of the nearby SUNBEAM jobber who maintains a complete warehouse stock of these furnaces.

Name_____

Address_____

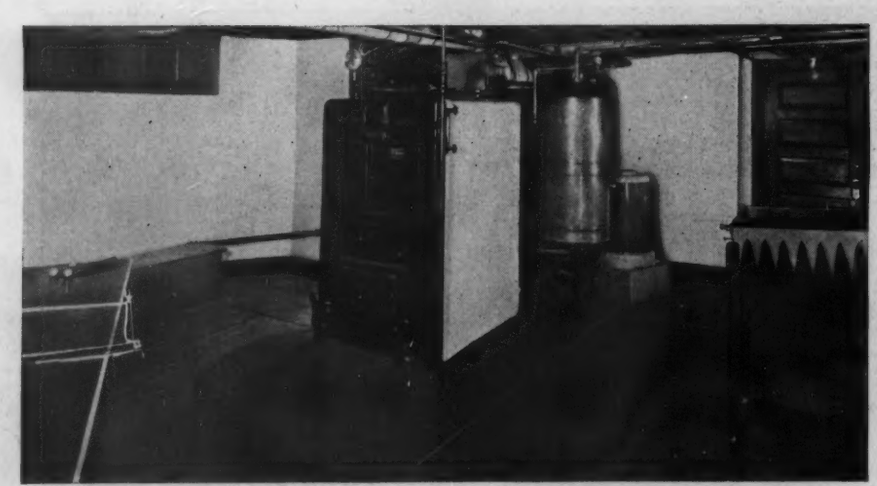
City_____

State_____

AA-8-37

ANTHRACITE HEATING NEWS

PUBLISHED BY ANTHRACITE INDUSTRIES, INC.
CHRYSLER BUILDING, NEW YORK



Picture shows typical installation of modern furnace, ash receiver, and Anthracite water heater. Note how the basement has been transformed into a game room.

● From now on, through October, is the time when new heating plants are being installed, and old heating plants are being modernized or repaired.

It is also the time when competitive equipment is sold most actively.

Work in close cooperation with local Anthracite dealers. By allied effort all of you will get more than a good share of the business that the season's activity presents.

● Meanwhile, Anthracite Industries, Inc. continues to advertise to builders, architects, banks and mortgage companies the advantages of Anthracite heating. The new developments in Anthracite equipment are being called to their attention.

Make the acquaintance of these people. Their recommendations control the fuel requirements of thousands of homes.

Anthracite is one of the nation's largest industries. It contributes about $155,000,000 to the national yearly payroll. Every ton of Anthracite sold not only adds to the national payroll but also to local payrolls.

● New York newspapers recently announced fuel oil prices for the coming heating season. Minimum price is 7½ cents a gallon. Maximum price is 8½ cents. Three years ago the low price was 5 cents a gallon, so during that period the price has risen 50%. Now, Anthracite's story of economy is more powerful than ever.



● Dealers pushing Anthracite Water Heaters and Regulators report great increases in sales. Possibilities are everywhere, for every third home lacks facilities for constant hot water. This new low-cost equipment brings the convenience of piping hot water, always on tap, within reach of most modest incomes. So tell every customer that these new water heaters need fueling only once a day with a few pounds of Anthracite. Explain how the new regulators automatically control the temperature of the water. Point out the savings in steps to the basement... the savings in time and labor. Sell Anthracite Water Heaters and Regulators and build bigger business.

This seal appears on Anthracite equipment only after it has passed the most rigid tests in the heating field.

● Dealers are making a big point of the wide range of automatic heat with Anthracite. Firing periods stretched to 12 hours with a thermostat installation. Magazine-fired heaters need firing only at 24 to 48 hour periods. There are also complete automatic Anthracite burners that feed fuel and dispose of ash all season. Thus, there's the right story to tell any prospect.

F L A S H

AMAZING NEW BOILER
Entirely New Principle



FOR STEAM, VAPOR OR HOT WATER HEATING

No piece of heating equipment in recent years holds more promise of sensational success than the New Anthra-Heat Unit. (Pictured above.) Entirely new principle. Combustion space and fire door eliminated. In the space formerly occupied by the combustion chamber, fuel is stored. This boiler needs no attention from one to three days, depending on weather. Fire level is always at same height. Air flows across the fire, instead of up through it. Flat spiral grate rotates to expel ash into receiver.

Great Fuel Savings

ANTHRA-HEAT UNIT

Write for names of Manufacturers

Pennsylvania ANTHRACITE COAL



Here is your Ticket

Take the MONCRIEF LINE

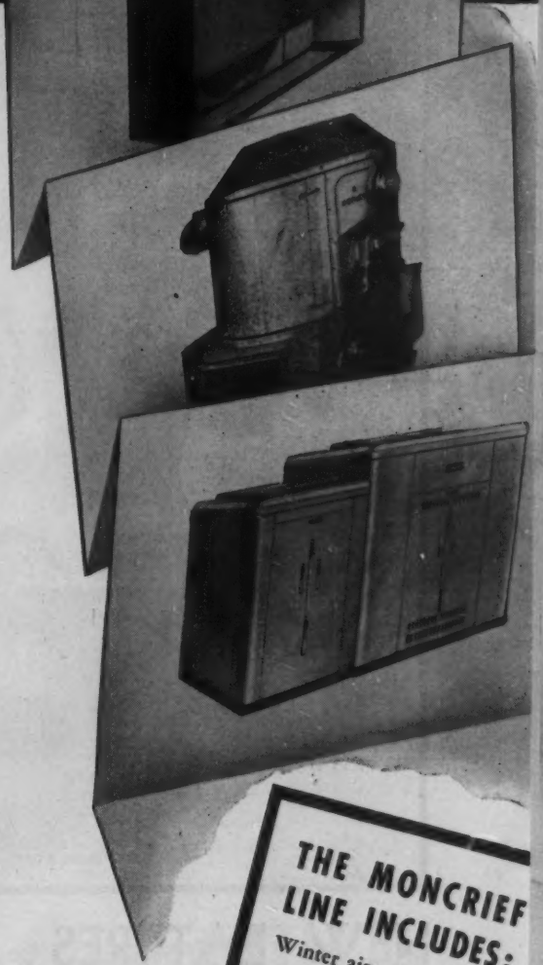
..the Direct Route to Bigger Profits

• Headed by a full series of newly styled and modern air conditioners, the complete Moncrief line now presents profit opportunities seldom, if ever before, equaled in the industry. The Moncrief line is America's Number One Business Opportunity in America's Number One Market.

With the complete Moncrief line you have a complete home heating and air conditioning business. From one dependable source of supply you can get everything you need; because Moncrief provides everything used on a warm air heating or winter air conditioning job.

In addition, Moncrief gives you the prestige of 40 years experience . . . a modern financing plan . . . a dependable engineering service to help you lay out heating plans and make estimates . . . effective advertising literature and sales helps.

If you are looking for the opportunity to profit in the rapidly expanding air conditioning and home heating business — get aboard with Moncrief. Write today for complete details.



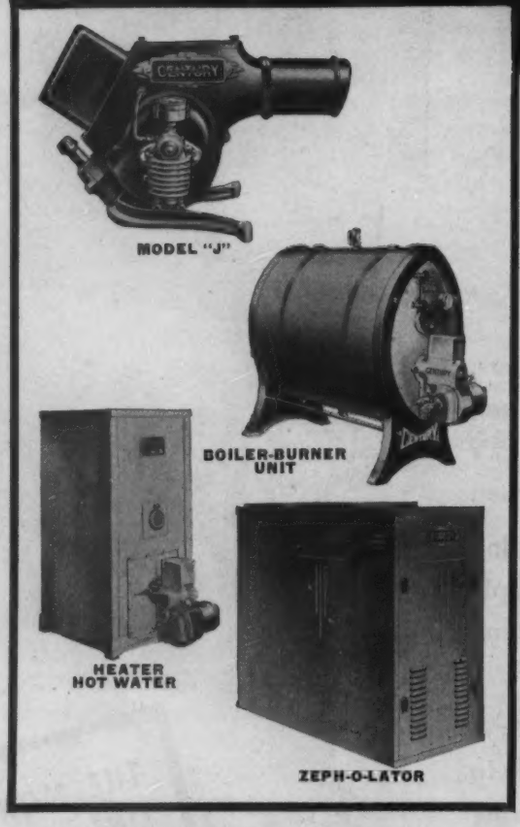
THE MONCRIEF LINE INCLUDES:

Winter air conditioners—gas, coal or oil . . . cast and steel furnaces . . . blower-filter units . . . automatic humidifiers . . . pipe, fittings, and accessories . . . everything used on a warm air heating or a winter air conditioning job.

THE HENRY FURNACE & FOUNDRY CO.

3473 EAST 49TH STREET • CLEVELAND, OHIO

Get CENTURY and you'll get ACTION



Whether your sales are running top speed, or just lagging along, it will pay you to investigate Century. For top speed to you may mean only half pace by comparison to what you could be doing with this complete line of conversion burners, Warm Air Conditioning Furnace Units, Boiler-Burner Units, and Hot Water Heaters.

Each Century model is distinctly designed in the modern manner. Outstanding and exclusive features give extra comfort, more convenience, and maximum overall heating efficiency. Customers expect to pay handsomely for these refinements, yet actually Century is priced so reasonably, it's easier to close every sale right on the spot.

There's still maybe an opportunity to get Century in your community. Write at once for full details of the complete line, or any individual model. All are backed by attractive, forceful advertising and selling helps . . . the kind you have always wanted. So get Century and get action. Write today. The CENTURY ENGINEERING CORPORATION, Cedar Rapids, Iowa.

NEW FEATURES . .

Only Century offers you the new and Improved Floating Flame . . . Even-Flo Combustion . . . A new Type Fuel Unit, containing pump, strainer and duplex combination shut-off and pressure regulating valve—all in one compact, interchangeable unit . . . plus many other features in the complete heating units.

CENTURY

Conversion Burners . Boiler-Burner Units . Warm Air Furnace Units with Air Conditioning . . Hot Water Heaters



Big government jobs use Everdur

This photo shows ducts of non-rust EVERDUR Metal in U. S. Department of Commerce Building, Washington, D. C.

Longer life for air conditioning systems Better business for you

SOONER or later, failure of ducts in air conditioning systems due to rust and corrosion will involve costly replacements. Tell your customers that the moisture in humidified air will attack rustable ducts; tell them that leaking ducts will spoil the efficiency of the system and perhaps damage the walls; tell them that duct repairs are difficult and very expensive to make. Then, *recommend ducts of non-rust Anaconda Copper or EVERDUR Silicon Bronze!*

The extra cost? Quite a bit, but time will prove that these non-rust metals are more than worth it.

Where welded ductwork is desired, use Everdur Metal. It's as rustless as copper, as strong as steel, and readily welded by usual methods. 37243

Everdur Metal

RUSTLESS AS COPPER
STRONG AS STEEL

THE AMERICAN BRASS COMPANY, General Offices: WATERBURY, CONNECTICUT

Offices and Agencies in Principal Cities • In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario

*EVERDUR is a trade-mark of The American Brass Company, registered in the United States Patent Office.

What Barber Burner
LEADERSHIP
Means to You



FOR a score of years, the BARBER MARK on any Gas Burner has been an emblem of dependability. It has been more than that —a pedigree of the *fitness* of that burner for its specific use. Every burner unit was *individually engineered* for its job. Every burner had the unique Barber combustion principle. That combination has never been equalled.

Leadership implies obligation. Barber business was never built on merely selling burners. It *was* built on developing and selling burners which are *correct* for their particular purposes. We can and will assist any reputable gas appliance manufacturer on that kind of problem.

It is a definite and permanent part of Barber policy to "lend a hand." Appliance makers, heating trade, and gas companies know that. We welcome the opportunity to work with you on any gas burner problem.

Write for Illustrated Catalog and Price List on Conversion Burners for Furnaces and Boilers, Burner Units for Gas Appliances, and Gas Pressure Regulators.

THE BARBER GAS BURNER COMPANY

H. M. MANSFIELD, President

3704 Superior Avenue
Cleveland, Ohio

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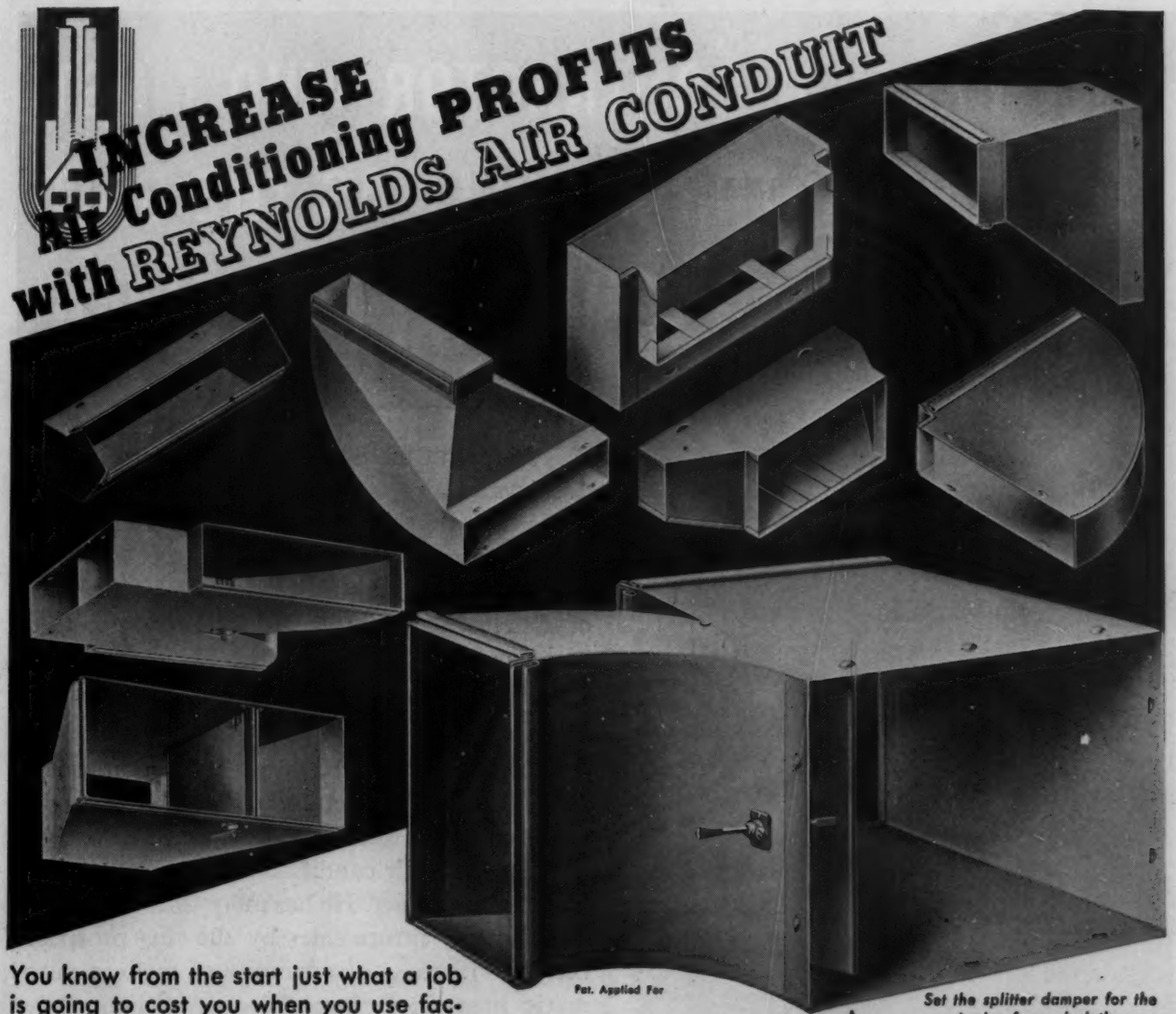
Address Michigan Inquiries to
The Barber Gas Burner Company of Michigan
4475 Cass Ave., Detroit, Michigan

BARBER BURNERS & REGULATORS ARE DESIGNED FOR

Air Conditioning Equipment • High Pressure Boilers (Tubular and Tubeless) • Bakery Ovens • Doughnut Kettles • Metal Pots • Garage Heaters • Coffee Urns • Hair Dryers • Space Heaters • Floor Furnaces • Clothes Dryers • Water Heaters • Confectioners' Stoves • Vulcanizing Machines • Pressing Machine Boilers • Japanning Ovens • Core Ovens • Banana Room Heaters and many other Appliances.

BARBER *Automatic* JET GAS BURNERS

INCREASE Air Conditioning PROFITS with REYNOLDS AIR CONDUIT



Pat. Applied For

You know from the start just what a job is going to cost you when you use factory-fabricated Reynolds Air Conduit. You reduce labor time and turn it into profitable sales time. You speed up installation — practically eliminate the possibility of erection mistakes. Selling cost comes down too, because you can give prospects accurate quotations without the expense of preliminary layout. It all sums up to MORE JOBS and BIGGER PROFITS for you on every job!

You are sure of real air distribution efficiency. The PRECISION CALCULATED — PRECISION CONTROL feature of Reynolds Air Conduit accurately regulates the flow of conditioned air into each room — each balanced and in correct proportion to its circulation and temperature needs. You lock the controls — the system *stays* balanced!

Return the coupon with your letterhead, or write us for complete information and prices. Get the name of our nearest distributor who carries a full stock of Reynolds Air Conduit for quick pick-up.

OTHER ADVANTAGES OF REYNOLDS AIR CONDUIT

1. Can be installed with any air conditioning unit.
2. Known cost on every job — accurate quotations without layout.
3. Only 15 fittings — 174 items in all assure quick material take-off.
4. At least 6'3" clearance below all main basement ducts.
5. Neat streamlined appearance — easy fitting.
6. Snap lock on all joints for air-tightness.

Set the splitter damper for the required c. f. m.—lock the control—and forget it. Precision calculated — precision controlled.



ATTENTION DEALERS!

We have a few territories still open for profitable distributor and dealer franchises to concerns of proven sales and financial responsibility. Write for details.

REYNOLDS CORPORATION
19 Rector Street, New York, N. Y.

Please send complete information on the following Reynolds products:

- ☐ Reynolds Air Ducts
- ☐ Reynolds Air Conditioner
- ☐ Reynolds Conversion Burner
- ☐ Reynolds METALLATION (reflective, metal insulation)

Name_____
Address_____
City_____
We are dealers ( ) Contractors ( )

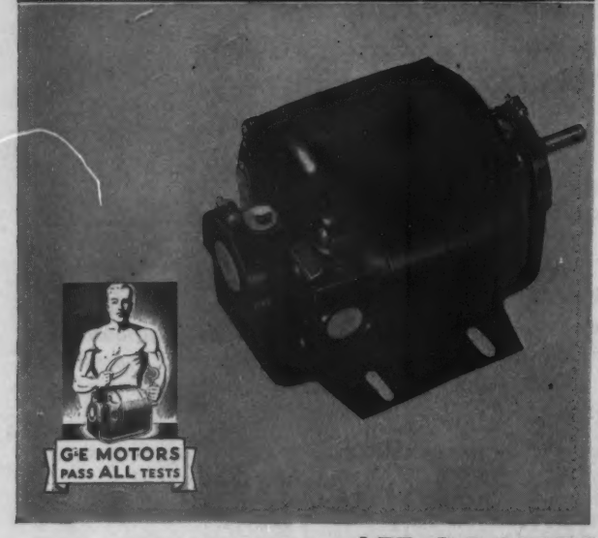
AA-8

ANY HEATING CONTRACTOR WHO MUST SELL THE MOTOR AS WELL AS THE UNIT WASTES TIME



HE doesn't have to do this extra work if the warm-air heating and air-conditioning equipment he sells is operated by G-E motors. When prospects are told that the motor is made by General Electric, they take the high quality of the electric equipment for granted. For General Electric is a company they know and trust —its high standards of quality need no explanation.

And that isn't all. High-quality features help sell. Thus, G-E motors, with their enviable service record, add to the sales appeal of his heating and air-conditioning equipment and make selling easier. He has more time to prepare the way for future sales by showing prospects the advantages and economies of modern automatic heating. General Electric, Schenectady, New York.



HIGH-QUALITY FEATURES OF G-E MOTORS

Indestructible Rotor—

A one-piece cast-aluminum rotor winding with permanent operating characteristics. No soldered or welded connections. Inherently well balanced.

Rubber Mounting—

Resilient rubber mounting isolates motor vibrations. Operation of the motor is almost inaudible. Quiet, cushioned power that appeals to any home owner.

Protected Windings—

Stator windings thoroughly bonded together. Resistant to vibration, moisture, heat, and mild acids and alkalis.

Long-lived Bearings—

Wool-yarn packing feeds a constant supply of fresh, filtered oil to the bearings. Extra-large oil capacity—oiling is necessary but once a year.

LET G-E MOTORS HELP YOU SELL

070-201

GENERAL ELECTRIC



WHAT! Listen Mr. Dealer

OVER 1,500,000 "SWEET YOUNG THINGS" THIS YEAR

and nearly 500,000 new homes too.

The Crise Floating Control draft regulator offers for the first time a complete unit to sell to the ultimate consumer for less than $30.00 (plus installation).

The motor is a reversible type, does not have to complete its cycle, spring return in case of current failure, no transformer, no brushes, no contacts, changes from high to low voltage within motor, permanently oiled and plugs in like radio or floor lamp.

The limit control is adaptable to warm air, steam or hot water. Compensates for weather changes without adjustment.

The thermostat is beautifully finished in either ivory or walnut. Supersensitive, single contact. **No degree differential,** needs no adjustment.

We have never had a thermostat returned for reasons of service failure in our five years of manufacturing.

The Crise Floating Control is sold only through authorized jobbers and manufacturers and to the heating trade only.

We urge you to write the nearest office listed below or for further information send in the coupon.

J. M. & L. A. Osborn Co., Buffalo, N. Y.; Cleveland, O.; Detroit, Mich.
Wigman Co., Sioux City, Iowa.
Indianapolis Machinery & Supply Co., 1950-1960 S. Meridian St., Indianapolis, Indiana.
Cincinnati Stamping Co., 28 W. McMicken Ave., Cincinnati, O.
W. B. Young Supply Co., 208 Delaware St., Kansas City.
Star Steel & Supply Co., 7522 Oakland Ave., Detroit, Mich.
Detroit Safety Furnace Pipe Co., 5960 Second Blvd., Detroit, Mich.
Republic Metals & Roofing Materials, Inc., 2222 W. 49th St., Chicago, Ill.
Milwaukee Plumbing & Heating Co., 715 Clybourn Ave., Milwaukee, Wis.
Baker Manufacturing Co., Omaha, Nebraska.
Anderson & Krapp, 916 Summit Ave., Toledo, Ohio.
A. G. Brauer Supply Co., 312 North Third St., St. Louis, Mo.
Proie Bros., 856 West North Ave., Pittsburgh, Pa.
Demmler Bros. Co., 100 Ross St., Pittsburgh, Pa.
Plumbers Supply Co., Louisville, Ky.; Lexington, Ky.



The Crise Floating Control is a profitable unit for the aggressive dealer. Once demonstrated it is sold. Installation is so simple. It will give years of trouble free service with no attention on the part of the dealer.

The Crise Electric Mfg. Co. expects its dealers to enjoy a profitable volume of business by fully protecting the sale of its product t h r o u g h legitimate channels.



COUPON

The Crise Electric Mfg. Co.
320 S. Main St.,
Mt. Vernon, Ohio.

Please send me my free copy of floating control folder.

Company name .....

Address .....

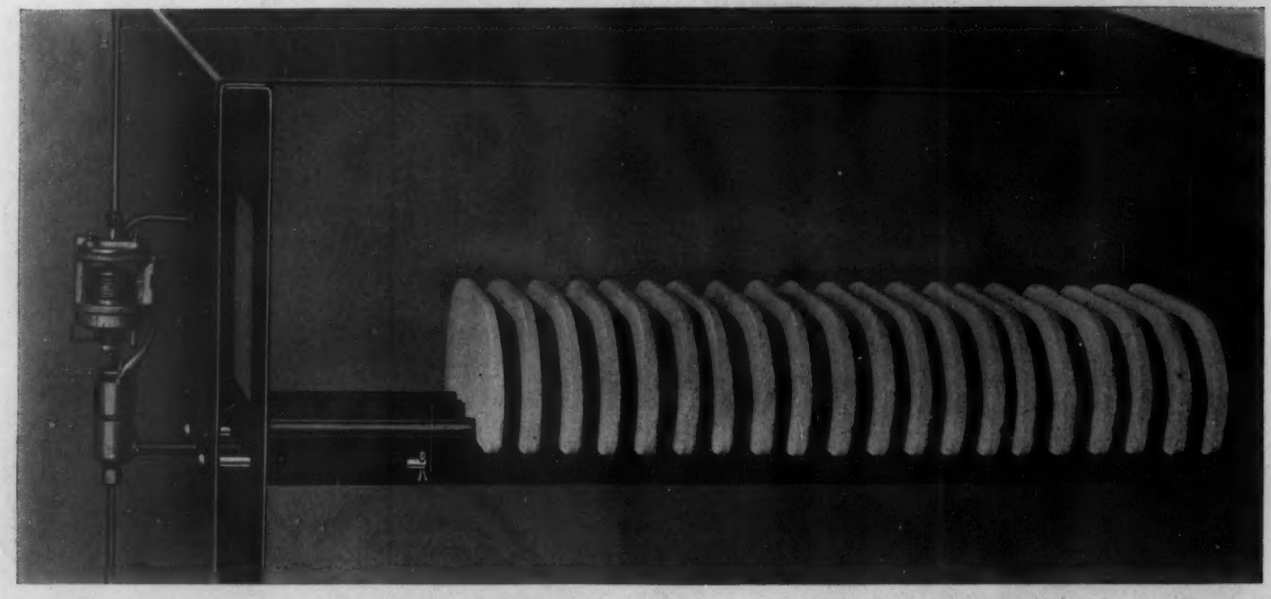
My name and title.....

THE CRISE ELECTRIC MFG. CO. MT. VERNON, OHIO

AUTOMATIC JUNE

HYDRO-METRIC HUMIDIFYING SYSTEMS

NEW IMPROVEMENTS INCREASE EFFICIENCY AMAZINGLY



Advanced Engineering Achieves Marvelous Capacity and Compactness

This new Automatic June Vapor Diffuser, with pan only 4" wide, has greater capacity than any open humidifier pan 4 feet wide of same length. In fact, to equal it the ordinary evaporating pan would have to be 5 feet wide.

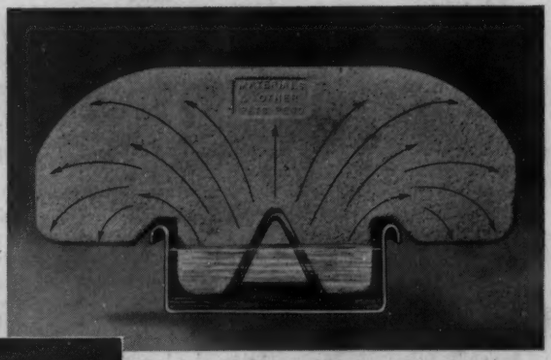
This great capacity and compactness insures adequate humidifying capacity even under low bonnet temperature of modern air conditioning furnaces, without restricting free air flow.

Write for new literature.

Monmouth Products Co.

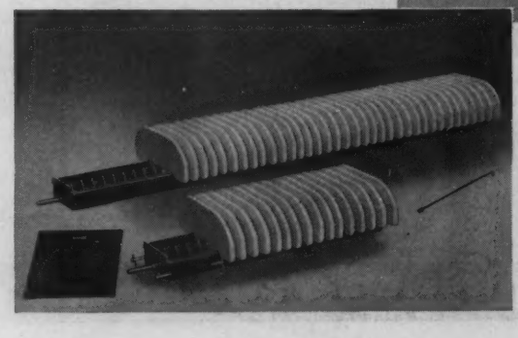
231 East 131st Street Cleveland, Ohio

The great evaporating capacity, absolutely necessary for the low bonnet temperatures of modern heating, is limited and controlled so that indoor humidity during any weather—mild or severely cold—is adequate for health, but never so high that windows stream or condensation occurs on outside doors, on and in outside walls, even during coldest weather.



Automatic June Humidifying Systems are endorsed by all leading air conditioning engineers as outstandingly superior in their field.

Automatic June at present either has been or is in process of being adopted as the standard humidifying system for all leading and higher class air conditioning furnaces.



Improved vapor diffusing plates, scientifically proportioned, wider, tapered, with deep overhang, give marvelously rapid absorption capacity. Each plate can lift over 2½ tons of water in one season—many times more than it is ever required to evaporate. Each plate can diffuse as much water vapor as 60 square inches of water surface in ordinary open pans.

PLACE YOUR CHIEF RELIANCE ON THE REPUTATION OF THE MANUFACTURER

Now MAKE YOUR EXPERIENCE PAY BIGGEST DIVIDENDS

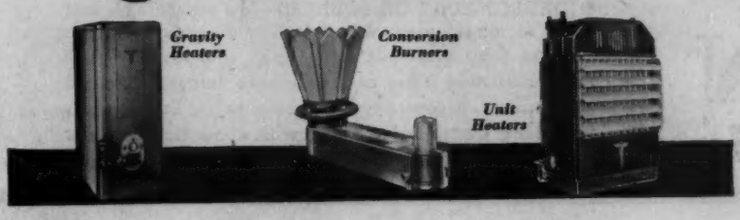


Sell **JANITROL GAS-FIRED WINTER AIR CONDITIONERS**

● The trend is to gas-fired air conditioning in the enormous new building market. Concentrate your efforts where volume business and big profits are to be made. Put your valuable merchandising experience behind Janitrol Winter Air Conditioners. Gas is recognized as the ideal air-conditioning fuel. Gas-fired Janitrol Winter Air Conditioners have the most salable features, are easy to install, require minimum servicing. Country-wide satisfaction with previous installations has created ready acceptance, which is now being rapidly augmented by a powerful program of national advertising. Write for information about the complete Janitrol line. The great Janitrol merchandising program and the Janitrol sound-slide film sales training program now available to back up your sales efforts.

Janitrol — a complete line of gas-fired air-conditioning and heating equipment for residential and commercial use.

SURFACE COMBUSTION CORPORATION • 2377 DORR STREET, TOLEDO, OHIO



MAIL THIS COUPON TODAY

Surface Combustion Corporation, Toledo, Ohio
Please send me your catalog "Janitrol Products" and explain your franchise.

*Name*_____

*Address*_____

*City*_____ *State*_____

Be prepared to be the **FIRST** *to serve*

INDUSTRY COMMERCE OR RESIDENCES

with a complete and Internationally Recognized Line of Oil Burners, oil fired boiler burner units and air conditioning equipment using from the lightest to the heaviest fuel oils.

Established in 1904, S. T. Johnson Co. is one of the oldest exclusive manufacturers of oil burning equipment in the country, and is today one of the first of the larger oil burner manufacturers to introduce a complete line to serve all types of industry, commerce and residences with required heat or power.

Don't miss the opportunity of quoting on all types of installations because of lack of proper equipment in correct sizes. Data sheets on each type of Johnson Improved Burners giving complete information are available for your consideration and your prospects... with full cooperation of the Johnson Engineering Department.

MEMBER OBI OIL BURNER INSTITUTE

● Worthwhile territories and Johnson franchises are available now to aggressive dealers anxious to serve their communities. Write today giving full details as to your qualifications.

S. T. JOHNSON CO.

Oakland, Calif. *and* Philadelphia, Pa.

940 Arlington 401 N. Broad St.

JOHNSON OIL BURNERS®



Selectair—a split system air conditioning unit—oil fired by the Johnson Pressure Type "Bankheat" Burner.

The compact "Bankheat" Burner

"Laddi"—an oil fired combination boiler-burner unit furnishing heat or domestic hot water or both in combination.

Manual or Semi-Automatic Heavy Duty Rotary Industrial Oil Burner Type No. 28. This burner and the fully automatic burners can be equipped with special fire hole plate for burning either gas or oil.

Heavy Duty Rotary Type Fully Automatic Burner 30AVH equipped with Johnson viscosity control valve Low Fire Starting and Modulated Firing and oil preheater, making possible the efficient and economical use of No. 6 fuel oil.

● JOHNSON BUILT OIL BURNERS—low pressure air and steam atomizers, manual and semi-automatic rotary type burners, fully automatic rotary type with low fire start and modulating firing accessories, combination oil and gas burners, pressure type burners, boiler burner units furnishing steam or hot water with domestic hot water and residential air conditioning equipment.

New...COMPLETE LINE



FRACTIONAL H. P. MOTORS

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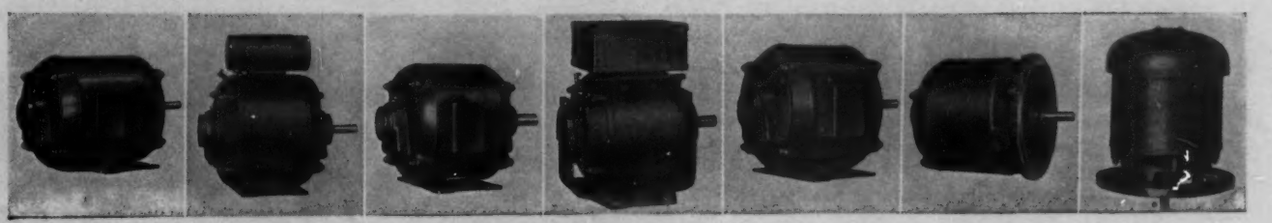
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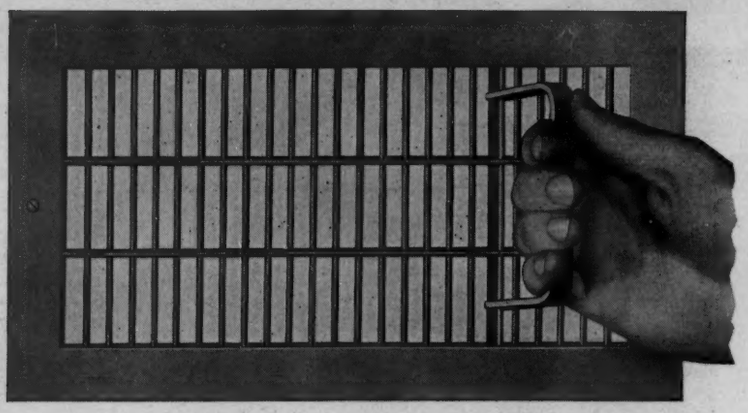
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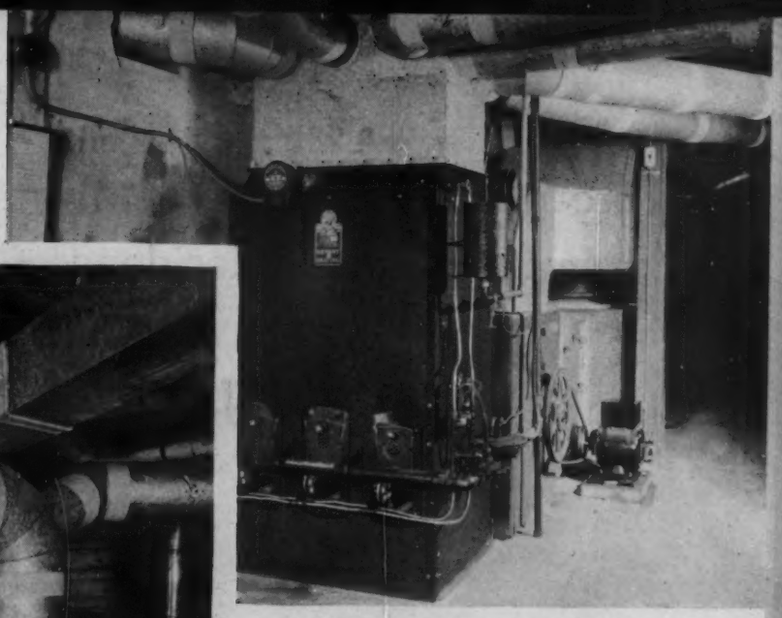
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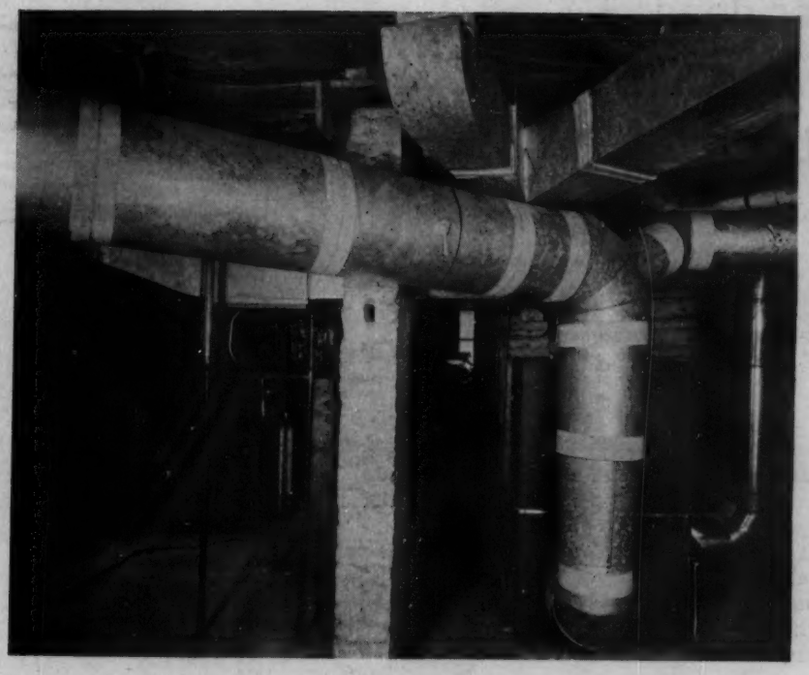
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This installation heats, cools and dries. The gas furnace with high plenum and round pipes for supply is shown above. The Silica Gel drying machine with air supply and return is at the right in the picture to the left. The cooling coils are left of the post. Below is the pump and pressure tank.

Cooling by Drying

AN osteopath in Cambridge, Mass., Dr. Perrin T. Wilson, whose home, operating rooms and offices are combined in one old fashioned dwelling house at 1626 Massachusetts Ave., has found that air conditioning by means of dehumidification, with gas firing, provides him with maximum comfort both for himself and his patients, at a low operating cost.

The system as now completed combines winter air conditioning, which was installed about a year ago, with summer cooling, which was installed in time for use during the hot months of last summer, June, July and August.



Cooling is by water from a well driven on the premises. The water comes in at 54 degrees F., an electric pump delivering ten gallons per minute. Water was struck at 24 feet. The designed central system supplies conditioned air, including filtering, dehumidifying and drying, to the greater part of the house, or to some twelve rooms on the lower floors, with a total of 25,000 cubic feet.

The system, installed by the Cambridge Gas Light Company, was planned by the company's engineer, W. D. McCrea, to operate at 83 degrees F dry bulb and 40 percent relative humidity. Actually, it has operated at 78 degrees F., with the 40 per cent relative humidity. While the ideal was originally considered as 80 to 82 degrees dry bulb, with 40 or 50 per cent relative humidity, several things connected with the doctor's practice call for the operating conditions as actually carried out.

Dr. Wilson and his assistant, both osteopaths, in giving their treatments, go through considerable ex-

(*Continued on page 62*)

Forced Air Heating Facts From the Research Residence—

Night Air Cooling

By S. Konzo
Special Research Associate
Engineering Experiment Station
University of Illinois

IN the first article (June) the nature of night air cooling and the quantity of air required to reduce the house temperatures at night were considered. In the second article (July) it was shown that by artificial ventilation the air velocity of the room air was increased. It was also indicated that the amount of heat removed during the night was quite large. Although night air cooling alone cannot be depended upon to produce conditions of comfort over the whole of a summer season, it can be used to alleviate conditions even in the most severe weather. Furthermore, the cost of operation of night air cooling equipment was most reasonable.

Installing the Attic Fan

This method of night air cooling (attic fan) is especially worthy of consideration on account of the possibility of obtaining large air changes with a small input of electrical energy. In the Research Residence installation, the 24-inch diameter, propeller fan delivered 3940 cfm with a power input of 0.32 kilowatts. In other words, the power required was 81 watts per 1,000 cfm air delivery. In comparison the power required for the basement fan installation was 188 watts per 1,000 cfm air delivery, or over twice as much as for the attic fan installation.

It may be evident that in an attic fan installation, outdoor air can be moved through a room only if means are provided for the entrance and exit of the air from the room. If the windows on the first story are locked at night, the amount of cooling to be expected on the first story will be small. Similarly, for installations in which the bedroom doors to the hallway are closed, it will be necessary to provide ceiling openings from each bedroom to the attic space. See Fig. 1 for three common methods of installing attic fans.

Where some amount of control is desired of the air quantity taken out of each room, an exhaust duct system should be provided, as shown in Fig. 1a, with ducts leading from each ceiling register to the intake of the centrifugal type fan. The ordinary propeller type fan is not suitable for this duct installation. It should be used only in cases where the inlet and outlet resistances are negligible, as shown in Figs. 1b and 1c. In the latter two methods of installation, especial care should be taken that all of the air handled by the fan is drawn from the lower quarters and is not that drawn in from outdoors through leaks in the attic.

Attic Fan Noise

Since the attic fan installation is usually located over sleeping quarters, and since noise is particularly objectionable during sleeping hours, the problem of noise prevention is one of the most difficult that is encountered. In the paper entitled "Comfort Cooling with Attic Ventilating Fans" by G. B. Helmrich and G. H. Tuttle, some limiting conditions are stated. These investigators found that in a properly installed, sound-insulated installation of a centrifugal type fan, it was necessary to limit the fan speed to about 300 revolutions per minute. The limiting register air velocities for ceiling type registers was determined as about 400 ft. per minute. The noise of a propeller type fan installation was found to be excessive for tip speeds of the blade exceeding 3,200 ft. per min. This is equivalent to the following maximum allowable speeds for various diameter propeller fans:

24 in. diameter—425 rpm.
22 in. diameter—465 rpm.
20 in. diameter—510 rpm.
18 in. diameter—565 rpm.

These investigators in Detroit also reported that the capacitor type motor was particularly well adapted for this service from the standpoint of quiet operation.

During the past few years this matter of vibration and air noise has been given serious consideration by the manufacturers and as a result many unique methods of rubber mountings, spring suspensions, and shock absorbers have been developed.

Attic fan installations can be adapted to homes that are heated with gravity warm-air, steam, and hot-water systems and hence are not as limited in

This discussion on night air cooling is based largely on the material published in the Engineering Experiment Station Bulletin No. 290 which is a report of the tests made in the Warm Air Research Residence of the National Warm Air Heating and Air Conditioning Association.

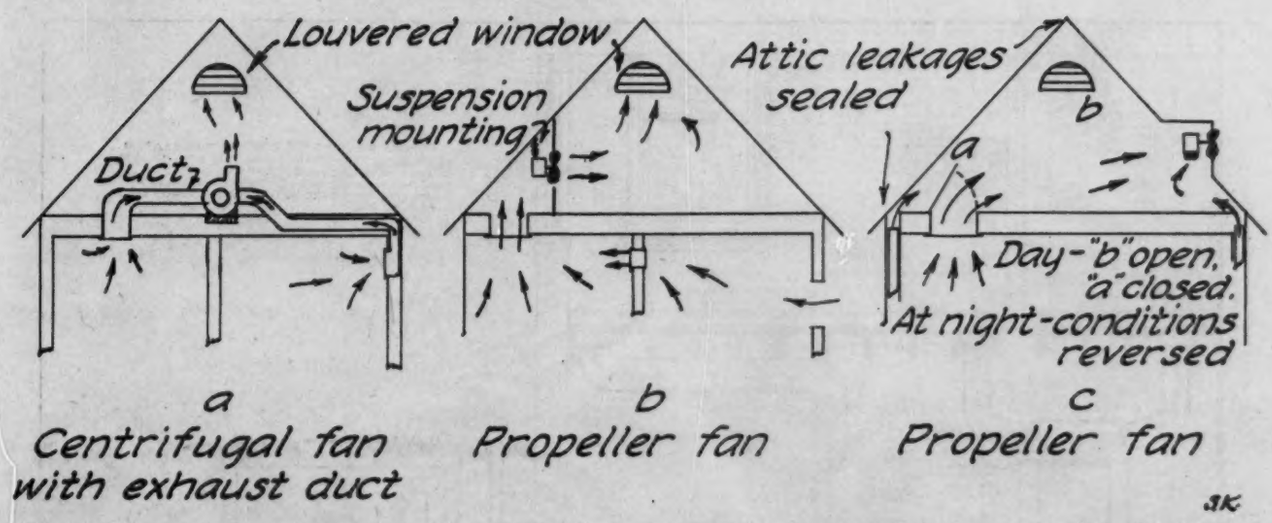


Fig. 1—Diagram showing three typical attic ventilating fan arrangements and suggested air movements within the structure.

application as the basement fan installation. On the other hand it should also be noted that this method of installation does not permit the filtration of the incoming air, nor does it allow for recirculation of indoor air during the daytime.

Installing the Basement Fan

The basement fan, which is an integral part of the forced-air heating system, can be so arranged that the unit can be utilized in summer as well as in winter. A suggested duct arrangement is shown in Fig. 2. It may be noted that the door, D, is made to swing and block the return duct, A, when it is desired to take in outdoor air through duct B.

The particular advantages of the basement fan over any other method of night air cooling may be itemized as follows:

1. The fan may be used for summer as well as for winter service.
2. The problem of noise reduction is simpler, although excessive fan speeds and air velocities will transmit noise into the house.
3. The use of filters above the fan inlet will to a certain extent keep the dust out of the house, although they will not keep out the dust brought in by the wind through the open windows. Where complete filtration is desired of all the air entering the house, the windows should be kept closed and the air from the rooms allowed to escape to the attic. Such filtration arrangements are necessary where removal of pollen is desirable.

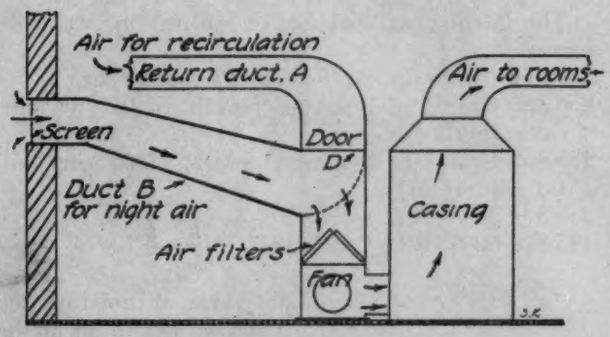


Fig. 2—Diagram of duct arrangement for night air cooling in a basement fan, forced air system.

4. The volume of air to be circulated in any room is under control and can be regulated by dampers.
5. Rooms that have locked windows can still be cooled to some extent if the air from the registers can escape from the room.
6. Arrangements can be made to recirculate the air in the house during the daytime to secure some amount of air movement in the house. In the case of an installation similar to that shown in Fig. 2, the door, D, can be adjusted to restrict duct B.

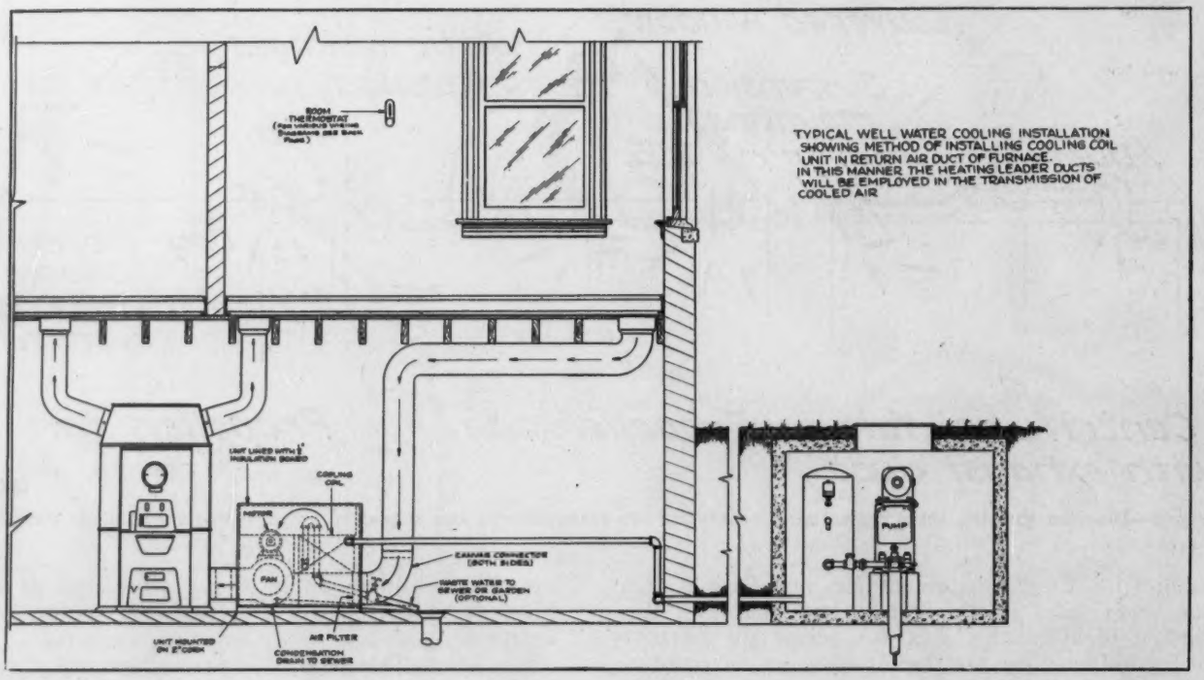
Disadvantages of Basement Fan

The obvious disadvantage of the basement fan when used for night cooling purposes is that the resistance of the duct system to the flow of air is an appreciable quantity and the air circulation obtainable is much less than that obtainable with an attic fan installation equipped with the same size motor. It is desirable to make the fresh air intake duct large in size and short in length in order to reduce the inlet resistance. It is possible, as in some of the Research Residence installations, to dispense with the fresh air intake duct and allow the air to flow through the open basement window, across the basement, and into the fan.

The ordinary forced-air heating system recirculates approximately four to seven air changes per hour. In order to obtain results in the summer that are at all comparable with those obtained with an attic fan installation, it would be necessary to have at least **twice the number of air changes in summer as that obtainable in winter.**

With a given duct system and with a given fan, in order to obtain double the air volume, the speed of the fan will also have to be doubled. Therefore, unless the fan in the forced-air system is selected for the maximum summer conditions, the fan in the forced-air unit may prove inadequate in providing sufficient air movement. In fact, if the fan in the ordinary forced-air heating system is selected only from a consideration of the winter heating requirements, the allowable increase in fan speed for summer conditions will probably not exceed 25 per cent. Even such arbitrary forcing of a given fan should not be attempted without giving due consideration to the motor capacity. An increase of even 25 per cent in the fan speed ratio will require almost 95 per

(*Continued on page* 66)



Well Water Cooling* [Part 3]

Example No. 1

ESTIMATE cooling load and amount of air to be circulated for bungalow shown in Fig. 1.

All ceilings—8′ 6″ high.

Walls—4″ brick veneer, 2x4″ studs, 1″ sheathing, lath and plaster.

Roof—1″ boards, composition shingles.

Ceilings—Wood lath and plaster on 2x6″ joists, 1″ pine floor above joists.

Windows—Double hung wood sash, weather stripped.

No insulation.

No awnings or shade.

Assume outside conditions..... 95° D.B., 75° W.B., 66° D.P., 38% R.H.

Assume inside conditions..... 80° D.B., 70° W.B., 65° D.P., 60% R.H.

(Final R.H. can be reduced if desired and if well water is 57° F. or below.)

Four people normally in the house. Neglect all mechanical equipment as but little cooking is done in hot weather and no lights are used in the day time.

*Reprint of a booklet Summer Air Conditioning With Well Water prepared by the National Domestic and Farm Pumping Equipment and Allied Products Manufacturers.

Total air due to infiltration = 5314 cu. ft./Hour = 88.5 cu. ft./Min. (C.F.M.) To reduce 88.5 C.F.M. from 95° D.B. to 80° D.B. requires 85.5 × 1.08 (.075 × .24 × 60) × 15 = 1435 B.T.U./Hr. Disregard the sun effect on the dining room, bath room and bedroom No. 2 as this heat will be balanced by the sun effect on the west wall in the afternoon, gives a sensible heat load per hour as follows:

Heat gain through walls, ceiling and glass	22,144
Infiltration	1,435
4 people at 225	900
Total Sensible Heat	24,479 B.T.U.

Latent Heat

The latent heat load due to infiltration is as follows:

5314 cu. ft. air/hr. × .075 = 398 lbs. air/hr.

256.3 = Grains of moisture per lb. of 95° dry air (at saturation)

155.8 = Grains of moisture per lb. of 80° dry air (at saturation)

256.3 × 38% (R.H.) = 97.39

155.8 × 60% (R.H.) = 93.48

3.91 Grains of moisture removed per lb. of air in passing through cooling coil.

$398 \times 3.91 = 1526$ + grains moisture removed from 5314 cu. ft.

4 people $\times$ 1200 = 4800 grains of moisture (infiltration)

6326 grains total amount of moisture removed by cooling coil

(Use: 1000 B.T.U.'s as latent heat per lb. of moisture)

(7000 grains moisture per lb.)

$$\frac{6326}{7000} = .904 \text{ lbs. of moisture}$$

.904 $\times$ 1000 B.T.U. = 904 B.T.U. total latent heat.

Sensible heat ..... 24,479 B.T.U.
Latent Heat ..... 904 B.T.U.

25,383
Add 10% safety factor..... 2,538
Total "Heat Load"..... 27,921 B.T.U. per hour

Example No. 2

Estimate cooling load and amount of air to be circulated for restaurant shown in Fig. 2.

Seating capacity .....63 people
Waiters, etc. .....10 people
Exhaust fan 900 C.F.M. capacity discharging into kitchen. Kitchen cooled only with exhaust fan.
25.....60 watt lights
1.....10 gallon coffee urn
1.....Dish warmer 10 sq. ft. shelf area

East exposure only. Figure 10° difference in temperature on party walls and ceiling.

Outside Conditions	95°	D.B.
	75°	W.B.
	66°	D.P.
	38%	R.H.
Inside Conditions	80°	D.B.
	70°	W.B.
	65°	D.P.
	60%	R.H.

Heat gain on east wall assuming all glass sq. Ft. glass 403.5, With sun effect = 25°, H = 3270 $\times$

(*Continued on page* 70)

	Living Room		Dining Room		Kitchen		Bed. #1		Bed. #2		Bath	
	Normal	Sun Eff.	Normal	Sun Eff.	Normal	Sun Eff.	Normal	Sun Eff.	Normal	Sun Eff.	Normal	Sun Eff.
Sq.Ft.Glass Coefficient B.T.U./Hour	60 1.13 1015	60 1.13 1690	30 1.13 507	30 1.13 845	13.5 1.13 229	13.5 1.13 381	30 1.13 507	15 1.13 423	30 1.13 507	15 1.13 423	12 1.13 203	12 1.13 338
Sq.Ft.Net Wall Coefficient B.T.U./Hour	286 .27 1170	280 .27 1690	80.5 .27 326	80.5 .27 543	164.5 .27 665	63.0 .27 425	191 .27 772	104 .27 702	216 .27 702	89 .27 600	47.5 .27 192	47.5 .27 320
Sq.Ft.Ceiling Coefficient *B.T.U./Hour	396 .28 3830		156 .28 1510		108 .28 908		168 .28 1410		267 .28 2540		56 .28 470	
Floor	....	....	....	....	....	....	....	....	....	....	....	....
Total B.T.U.	5515	3560	2143	1388	1901	806	2689	1125	3620	1023	865	658
Ft.Window Crack Coefficient Cu.Ft.Air/Hour	76 23.6 1795		38 23.6 898		18 23.6 425		38 23.6 898		38 23.6 898		17 23.6 400	

* Attic temperature assumed to be 110 deg.

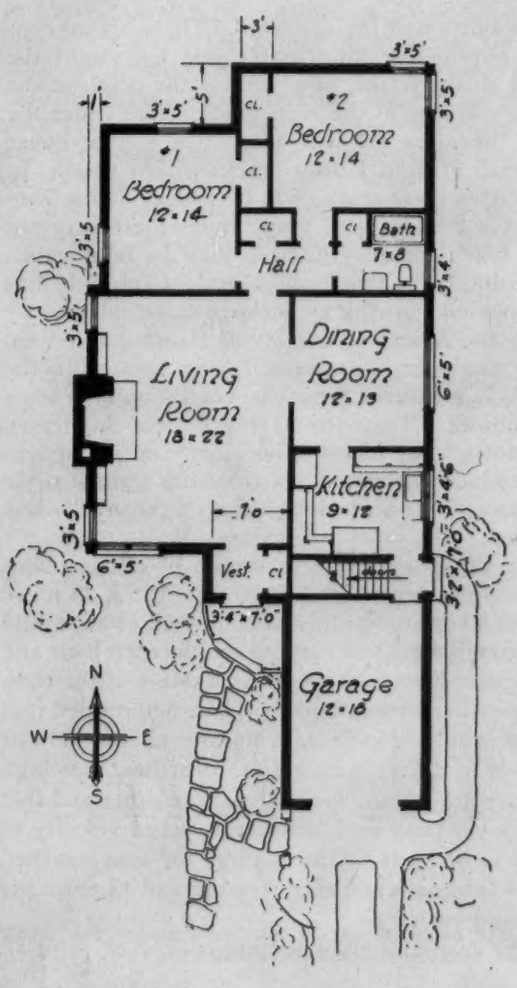


Fig. 1—Left—Plan of bungalow for which a cooling system with well water is worked out as example 1.

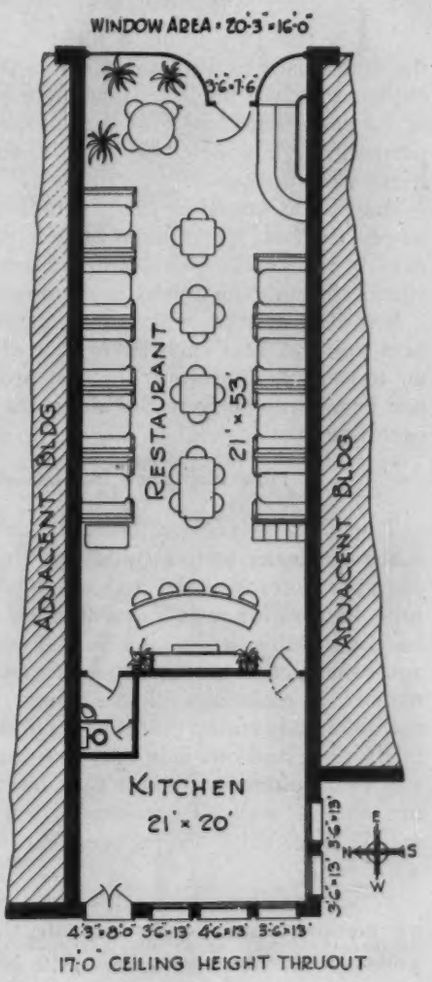


Fig. 2—Right—Plan of restaurant used in example 2. The text develops the engineering design step by step.

		UNIT SIZE							OUTSIDE TEMPERATURE T = −10°					
		TOTAL B.T.U.			TOTAL C.F.M.				ATTIC TEMPERATURE T = 0°					
		HEAT LOSS COEFFICIENT U PER DEGREE PER HOUR	OUTSIDE WALL U_o=.25		CEILING U_c = .10				BASEMENT WALL ABOVE GRADE U_b=.12					
			GLASS U_o=1.13		ROOF U_R = ✓				BASEMENT WALL BELOW GRADE U_b=.062					
			INSIDE PARTITION U_i=.62		FLOOR U_f = .19				BASEMENT FLOOR U_f = .06					
			INFILTRATION = .018						MEAN TEMP. GROUND BELOW GRADE = 15°					
1	ROOM USE OR ROOM NUMBER	LIVING RM.	DINING RM.	KITCHEN	HALL & VESTIBULE	BED RM.#1	BED RM.#2	BED RM.#3	BATH RM.	HALL UP	RECREATION	LAUNDRY		
2	ROOM TEMPERATURE	72°	72°	70°	70°	70°	70°	70°	75°	70°	70°	70°		
3	ROOM SIZE & HEIGHT	12×22×8	11×12½×8	25×5×8 8×7×8	5×8×8	12×7½×8	10×13×8 12½×10×8	14×12×8 6×5×8	5×7×8 8×7×8	6×5×8 5×3×8	11½×28×7	16×4×7		
4	CUBIC CONTENTS	2250	1150	1194.25	340	720	1180	1184	654	666	1750	896		12430
5	GROSS SQ. FT. OUTSIDE WALL	355	198	221	43	116	200	208	138	128	36	—		
6	TOTAL SQ. FT. GLASS & DOORS	50 / 92.7	38 / 92.7	33 / 90.4	21 / 90.4	12 / 90.4	23 / 90.4	23 / 90.4	8 / 76.1	23 / 90.4	9 / 90.4	9 / 90.4		
7	NET SQ. FT. OUTSIDE WALL	305 / 20.5	160 / 20.5	188 / 20.0	22 / 20.0	104 / 20.0	177 / 20.0	185 / 20.0	130 / 21.3	105 / 20.0	36 / 20.0	—		
8	SQ. FT. INSIDE WALL	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
9	SQ. FT. BASEMENT WALL ABOVE GRADE	✓	✓	✓	✓	✓	✓	✓	✓	✓	80 / 25.6	39 / 44.8		
10	SQ. FT. BASEMENT WALL BELOW GRADE	✓	✓	✓	✓	✓	✓	✓	✓	✓	223 / 20.4	120 / 34.1		
11	SQ. FT. CEILING	✓	✓	✓	✓	101 / 6.6	152 / 6.6	155 / 6.6	82 / 7.0	88 / 6.6	✓	✓		
12	SQ. FT. ROOF	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		
13	SQ. FT. FLOOR	✓	✓	✓	✓	✓	✓	✓	✓		249 / 15.9	128 / 15.9		
14	INFILTRATION	1400 / 1.49	1400 / 1.48	1550 / 1.44	1000 / 1.44	660 / 1.44	660 / 1.44	660 / 1.44	540 / 1.53	1360 / 1.44	1800 / 1.44	900 / 1.44		
15	EXPOSURE													

The data sheet shown here is the form recommended for use with the new code. The sheet has been filled in for the system shown in the floor plans. The text explains how the entries were calculated.

The New Technical Code

IN the July issue, a filled in data sheet for the house used as our example was published. The explanation was made that the data sheet was filled in for coefficients, also for dimensions and areas of parts through which heat is lost, and the first 13 items were discussed.

Item 14, as stated in July, is infiltration—in other words, the heat which must be delivered by the furnace to heat up to room temperature the air which comes through the cracks in windows and doors.

Knowing that it will take a certain number of heat units to heat each cubic foot of this incoming air to room temperature, our first problem is to find just how many cubic feet of air comes into our house each hour.

How Infiltration Is Calculated

There are several methods for determining how much air leaks into a building. In the first mechanical code, in order to save multiplication and time, infiltration was calculated on an air change basis. In other words, it was assumed that in average construction an amount of air equal to a certain number of room air volumes would leak in. Thus the older code stated that if doors and windows were fairly tight and one side only was outside wall, one room air volume will enter each hour. If two sides are outside walls, 1½ room air volumes will leak in. If three sides are exposed, 2 room air volumes will enter.

While many engineers maintain that this short-cut method is sufficiently accurate, the thorough engineer always wishes to take into consideration the actual condition of the windows. These actual conditions require checking to see just how tight the sash are in the frame, how wide is the crack at the meeting rail and in the sash guide. The wider the cracks, the more air will enter. In a new house where sash fit tightly these cracks will be small. In older houses these cracks will be wider. If the windows have been painted many times there may not be any cracks at all—the sash may be immovable.

Accordingly in this code a table (Table 4) has been included showing air leakage as established by tests by the American Society of Heating and Ventilating engineers. In establishing this table the A.S.H.V.E. measured the actual cracks found in some 600 windows. Then the averages were duplicated in windows built in the laboratory and a fan was set up to blow air at various velocities against these windows and the air leaking through the cracks was measured.

From these tests it was established that under outside wind velocities of 5, 10, 15, 20, 25, 30 miles per hour a certain number of cubic feet of air would leak through cracks of varying widths each hour and these figures have been set up as Table 4 of the code. From weather bureau reports it was determined that average wind velocities during the winter months prevailed in different localities. Further, that high winds are not usually found in zero weather and that 15 miles per hour is a satisfactory wind velocity to use for most parts of the country for zero weather. Table 4 is based upon zero weather and 15 miles per hour wind velocity.

In the formulas used in this code (see page 57,

March, 1937, issue) formula 9 (infiltration) gives the formula for infiltration as:

$$\text{Infiltration} = .018 \times C \times L \times (t_i - t_o)$$

in which:

.018 = 0.24 × .075

0.24 = specific heat of air

.075 = density of air (lb./cu. ft.) at inside temp.

C = air leakage in cubic feet per linear foot of crack per hour at 15 miles per hour wind velocity from Table 4

L = length of exposed crack in feet determined from plans or measurements

t_i = inside design air temperature

t_o = outside design air temperature from Table 5.

The C used in the formula is chosen from Table 4 for the condition of the windows inspected in an old house or assumed as tight from plans for a new house.

The item L may need additional explanation. If a room has only one side exposed, any wind blowing against that side will leak in through all cracks. On the other hand, if there are two sides exposed, the wind can blow *directly* against only *one* side at *one* time. Or, if the wind is quartering, it can blow against both exposed sides, but *not directly*. It cannot, therefore, exert full pressure against both sides and the cracks along one side will be barely exposed.

In calculating the length of a crack, then, if two sides of a room are exposed the code suggests that the outside wall having the largest number of doors and windows or the group of windows and doors with the greatest length of crack be used and the rest disregarded. If there are three sides exposed, take the wall having the greatest length of crack, but in no case use less than one-half the total crack length in all three walls.

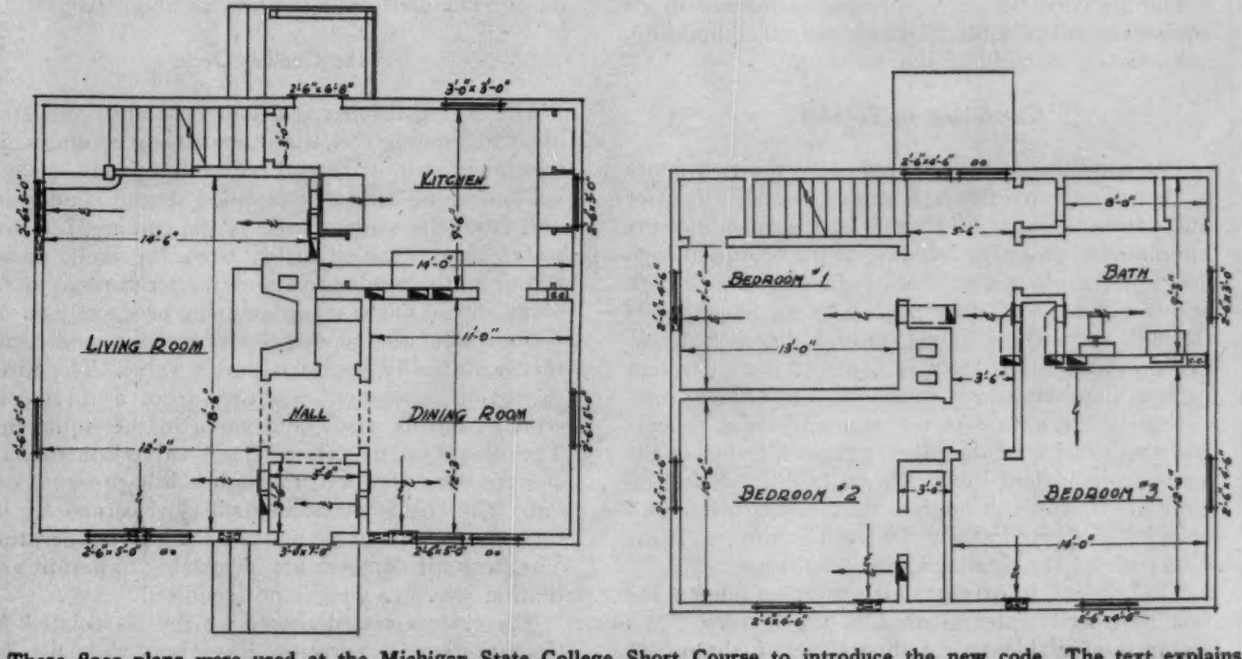
To illustrate the application of this formula and these rules, let us use the floor plans of the example house and take a look at item 14 (infiltration) on the data sheet. It will be noted that again the rectangle for each room is divided obliquely with two figures written in.

In the first room (living room) the rectangle shows 1,400 in the upper area and 1.48 in the lower. Let us analyze the 1.48 first. From the upper portion of the data sheet we find the infiltration coefficient .018 printed in. From item 2 we see that the design inside temperature is 72 degrees. The system is to be installed for —10 degree weather, so our temperature rise from outdoors to indoor is —10 degrees to 72 degrees or 82 degrees. Then 82 times .018 equals 1.476 or 1.48. In rooms like the kitchen, where 70 degrees is to be maintained, the factor will be 1.44, since .018 times 80 equals 1.44. In the bathroom we will have .018 times 85 equals 1.53.

The other figure in each room rectangle in item 14 is obtained by multiplying the number of feet of cracks *exposed* by the leakage per foot of crack per hour taken from Table 4. Looking at the living room floor plan we see that there are four windows—all the same size, two in each side. In each window we will have a crack at the top, another at the meeting rail and a third at the bottom and one up and down crack at each side. Each window measures 2 feet 6 inches wide by 5 feet high. With three cracks across, we multiply 2 feet 6 inches by three equals 7 feet 6 inches and multiply 5 feet by 2 equals 10 feet. We add 7 feet 6 inches to 10 feet and have 17 feet 6 inches of crack for each window.

Remembering that we figure window cracks for only one side, we have 17 feet 6 inches times 2 windows equals 35 feet of crack in each wall. From Table 4 we see that double hung wood sash, unlocked, of average tightness has $\frac{1}{16}$-inch crack and $\frac{3}{64}$-inch clearance and by test shows a leakage of 39.3 cubic feet of air per foot of crack per hour.

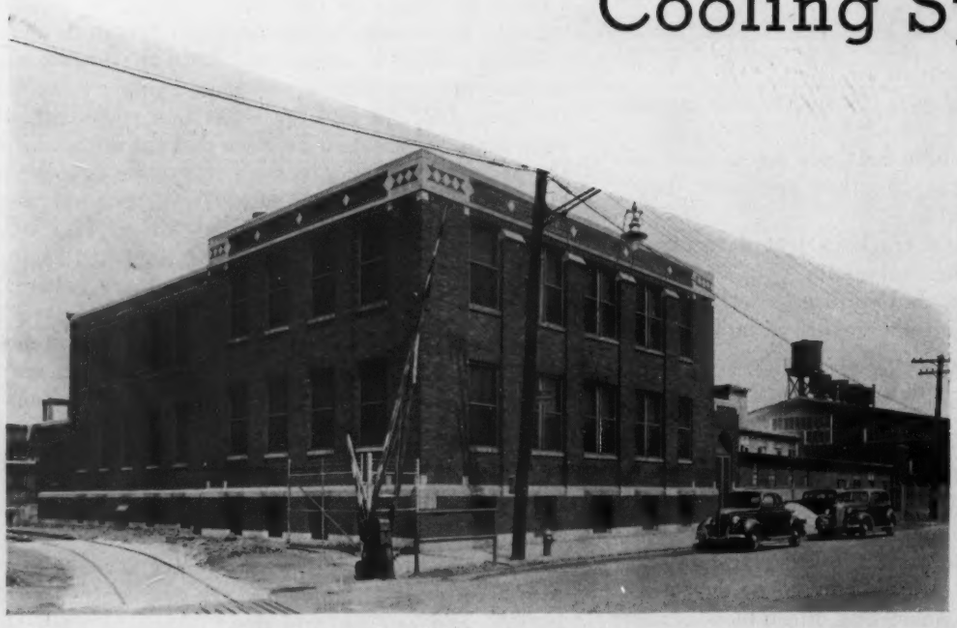
(*Continued on page 76*)



These floor plans were used at the Michigan State College Short Course to introduce the new code. The text explains how infiltration is calculated in the new code for the outside openings shown here.

Cooling System For

An merican Artisan Cooling Study



Exterior of office building showing exposure and type of construction.

THE George S. Mepham Corporation, one of the larger manufacturers and importers of mineral pigment, have let contracts for an air conditioning system for their general offices in East St. Louis, Ill., containing many interesting features not ordinarily found in the average installation.

The system is of the central type, with conditioned air being supplied through ducts, being installed by the Lang Sheet Metal Company, 1502 State Street, East St. Louis.

The air conditioning equipment is located in an equipment room, built to match the office building, immediately outside of the building.

Conditions to Be Met

The conditioned air is supplied to the two floors of the office space through supply ducts. The riser ducts from the unit are located on the outside of the building and enter the building at the ceiling of each floor. All outdoor duct work is insulated with cork and weather-proof covering. The air is supplied through the various rooms through directional flow grilles. Recirculated air is brought back through hallways and stairways to the air conditioning unit.

Due to the nature of the manufacturing process and the location of the plant, proper filtering of the air is an important item. All air, both fresh and recirculated, passes through a bank of ten filters at a velocity of approximately 500 feet per minute. These filters are of the cleanable, dry wool type.

The system is of particular interest due to the fact that well water is used in the factory. This water is available at a temperature of about 57°. Use is made of the well water for sensible cooling, the water being taken from the well, passed through water coils in the air conditioning unit and then given back to the plant, to be used in their process work. About one half of the load is taken care of by water. The balance of the load is handled by a ten horsepower Freon condensing unit with shell and tube condenser. Air enters the cooling unit and passes over the water cooling coils, where it is cooled down to about 67°. It then passes over the direct expansion coils, where dehumidification takes place. The air leaves the unit at about 63°.

The Cooling Cycle

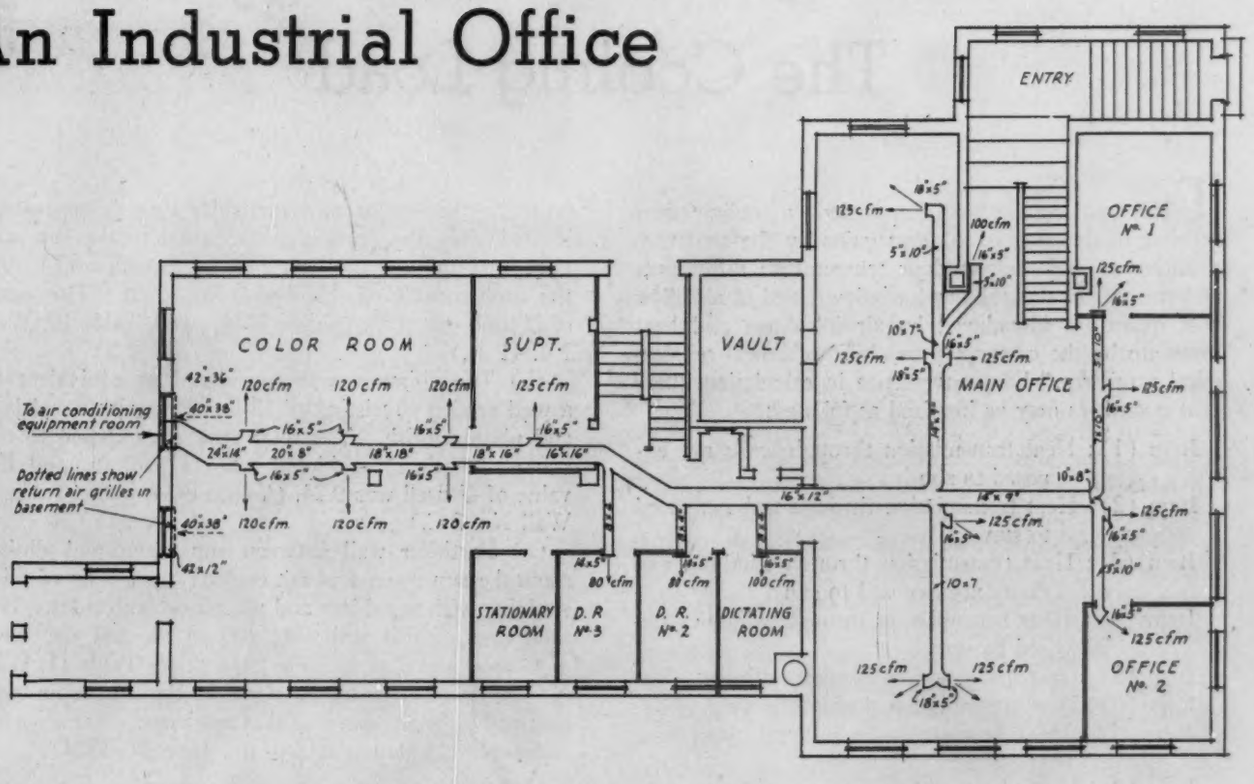
The air conditioner is a floor type unit, consisting of water cooling coil, direct expansion cooling coils, humidifier, fan, drive and motor equipment.

Condensing water is supplied to the condensing unit from the same source as the cooling, i. e. well water that is taken direct from the well, passed through the condensers and then returned to the plant for use in the manufacturing process.

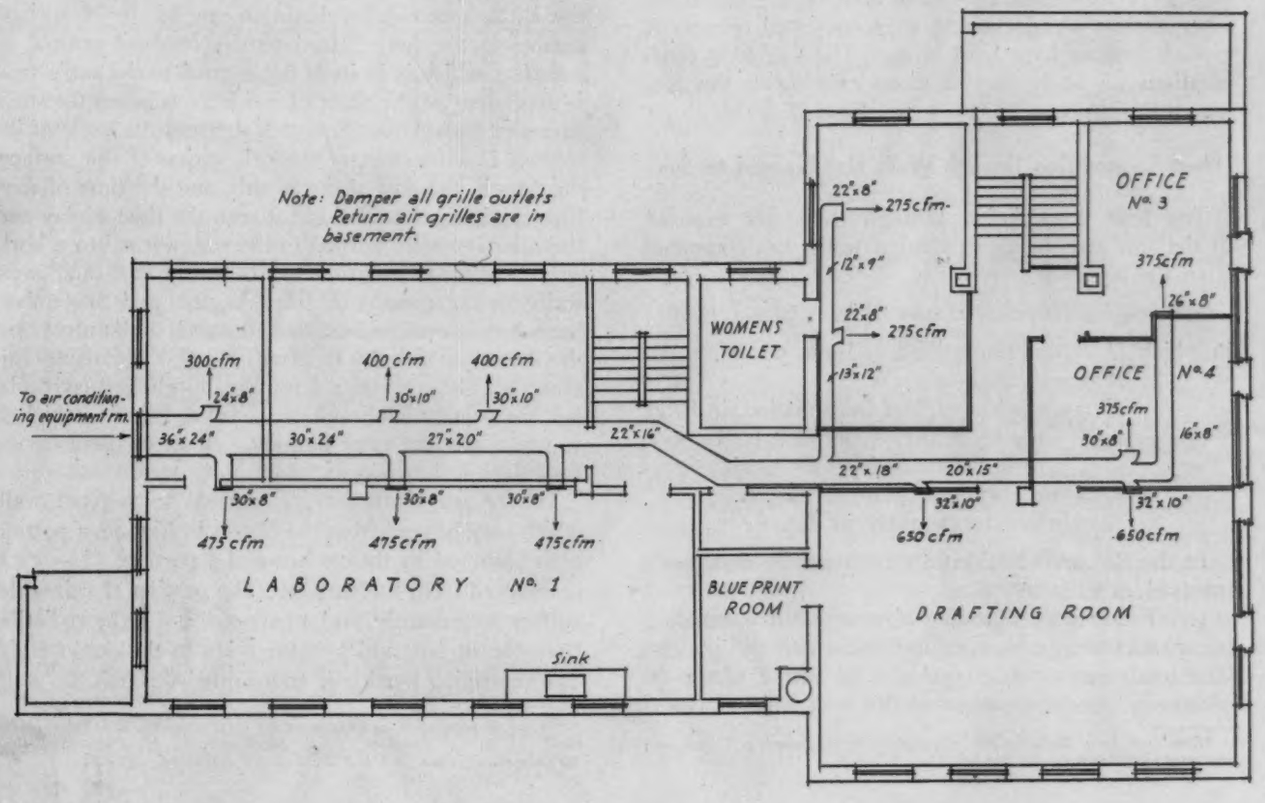
Control of the cooling water is by a modulating thermostatically operated motor valve. The direct expansion equipment operates from a thermostat which controls a solenoid valve in the liquid line. The operation of this solenoid valve controls the compressor operation, through a low pressure cut-out. The thermostatic control is governed by the return air temperature and the outdoor temperature. The fresh air dampers are adjustable to permit ventilation when cooling is not required.

The system was designed by the Associated Air Conditioning Corporation, Engineers, and Distributors for the equipment.

An Industrial Office



The first floor plan above shows the location of supply ducts and branches just below the ceiling. The air returns down the stairway and through two large return grilles in the basement wall at the left side of the plan. The supply for the second floor (below) feeds through a riser outside of the building. The equipment is located in an attached building alongside the main structure. The air volumes delivered are noted at all registers.



Method For Calculating The Cooling Load*

THE total cooling load imposed on a cooling plant consists of the sum of all heat gains by the structure resulting from indoor-outdoor temperature differences and sun effects on walls and windows, and of all other heat quantities introduced by air inleakage and heat given up by the occupants and by mechanical or electrical processes. For convenience in calculation, these heat quantities may be itemized as follows:

Item (1); Heat transmission through walls not exposed to sun
Item (2); Heat transmission through walls exposed to sun
Item (3); Heat transmission through windows and doors not exposed to sun
Item (4); Heat transmission through windows exposed to sun
Item (5); Heat transmission through ceilings
Item (6); Heat transmission through floors
Item (7); Heat brought in by infiltration or ventilation air
Item (8); Heat given off by occupants
Item (9); Heat given off by electric lights
Item (10); Heat given off by electric motors

In computing the cooling load for the Research Residence, the values of coefficients of heat transmission and enthalpies of mixtures of water vapor and air as given in the American Society of Heating and Ventilating Engineers' Guide for 1934 have been used. Wherever other sources of information were consulted references to such sources have been given. The following computations all apply to conditions existing at the Research Residence at 2:00 p. m. on June 27, 1934.

Heat Transmission Through Walls Not Exposed to Sun

The heat transmission through walls not exposed to the sun and through partition walls was computed from the equation

$$H = AU\,(t_o - t_i) \quad \ldots\ldots\ldots\ldots (1)$$

in which H = heat transmitted in B.t.u. per hr.
A = wall area, in sq. ft.
U = coefficient of heat transmission, in B.t.u. per sq. ft. per hr. per deg. F. temperature difference from air to air
t_o = outdoor temperature, in deg. F.
t_i = indoor temperature, in deg. F.

In the Research Residence three types of walls were involved, as follows:

(a) Frame wall consisting of weatherboard, building paper, sheathing, 6-in. studding, wood lath and plaster. The total area of this type of wall was 1767 sq. ft. However, since the portion of this wall which was exposed to the sun at any particular time is separately treated, only the portion not exposed to the sun was used in computing the heat gain by Equation (1). At the time considered this was 1304 sq. ft. The value of U used was 0.25, (Guide 1934, p. 85, Table 10, Wall No. 41 A.)

(b) The chimney was considered as equivalent to a wall section consisting of 12-in. brick with wood lath and plaster finish. The total area not exposed to the sun at the time considered was 117 sq. ft., and the value of U used was 0.24, (Guide 1934, p. 83, Table 8, Wall No. 2 C.)

(c) Partition wall between sun room and dining room the sun room was not cooled), consisting of 6-in. studding with wood lath and plaster on both sides. The total area of this wall was 100 sq. ft. and the value of U used was 0.34, (Guide 1934, p. 86, Table 11, Wall No. 53 B.) The temperature in the sun-room was assumed to be the same as that outdoors.

Sample calculation at 2 p. m., June 27, 1934:

$H_{1a} = 1304 \times 0.25\ (97.1 - 79.9) = 5607$ B.t.u. per hr.
$H_{1b} = 117 \times 0.24\ (97.1 - 79.9) = 483$ B.t.u. per hr.
$H_{1c} = 100 \times 0.34\ (97.1 - 79.9) = 585$ B.t.u. per hr.

Total H for walls = 6675 B.t.u. per hr.

Heat Transmission Through Walls Exposed to Sun

The intensity of the sun is generally expressed as the B.t.u. received per hour on one sq. ft. of surface normal to the sun. The intensity received normal to a surface which is in itself not normal to the sun's rays is dependent on the angle of incidence between the sun's rays and the surface. For such surfaces the angle of incidence is a function of the orientation of the surface, the month, the day of the month, and the time of day. Curves giving the relation between the time of day and the solar intensity normal to the sun, normal to a horizontal surface, and normal to south, east and west walls for the months of July, August, and September, have been developed at the Research Laboratory* of the American Society of Heating and Ventilatting Engineers. These curves are for Pittsburgh, Pennsylvania, but are equally applicable to Urbana, Illinois, which is in practically the same latitude. A set of these curves for July 1 is shown in Fig. 38.

Of the sun's intensity, I, normal to a given wall, which may be read from the curves in Fig. 38, a portion eI is absorbed by the surface and a portion, $(1 - e)\ I$, is reflected from the surface. The portion eI raises the surface temperature, and a part of it is lost by radiation from the surface and by convection to the outdoor air. The remaining portion is transmitted through the wall.

*Reprinted from Bulletin 290, Appendix B, Engineering Experiment Station, University of Illinois.

*"*Heat Transmission as Influenced by Heat Capacity and Solar Radiation*," by F. C. Houghton, J. L. Blackshaw, E. M. Pugh, and Paul McDermott. Trans. A.S.H.V.E. Vol. 38 ,1932, pp. 281-279.

In the case of such sun-exposed walls Equation (1) for heat transfer from air to air on the two sides of the wall is not applicable. The following equations,* however, may be written as applying to this case:

$$eI = H_1 + H_2, \text{ or } H_2 = eI - H_1 \quad \ldots\ldots (2)$$

$$H_1 = f_o(t_x - t_o) \quad \ldots\ldots (3)$$

$$H_2 = C(t_x - t_y) \quad \ldots\ldots (4)$$

$$H_2 = f_i(t_y - t_i) \quad \ldots\ldots (5)$$

in which I = solar intensity normal to the surface, in B.t.u. per sq. ft. per hr.

e = coefficient of absorption of solar radiation.

H_1 = heat lost from outside surface by radiation and convection, in B.t.u. per sq. ft. per hr.

H_2 = heat transmitted through wall, in B.t.u. per sq. ft. per hr.

f_o = outside surface coefficient, in B.t.u. per sq. ft. per hr. per deg. difference in temperature between the surface and the air.

f_i = inside surface coefficient, in B.t.u. per sq. ft. per hr. per deg. difference in temperature between the surface and the air.

C = conductance of wall, in B.t.u. per sq. ft. per hr. per deg. difference in temperature from surface to surface.

t_o = outdoor air temperature in deg. F.

t_i = indoor air temperature, in deg. F.

t_x = outdoor surface temperature in deg. F.

t_y = indoor surface temperature, in deg. F.

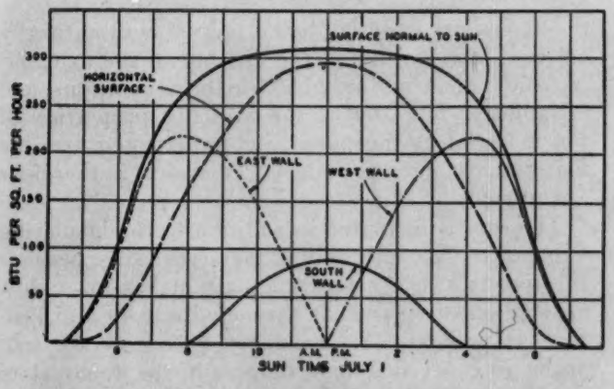


Fig. 38.—Curves Giving Solar Intensity Normal to Sun, on Horizontal Surface, and on Walls for July 1. Copyright American Society of Heating and Ventilating Engineers—from A. S. H. and V. E. Transactions, Vol. 38, 1932.

The general solution of Equations (2) to (4) gives

$$H_2 = \frac{eI + f_o(t_o - t_i)}{1 + f_o\frac{1}{C} + \frac{1}{f_i}} \quad \ldots\ldots (6)$$

By introducing the equation for the overall coefficient of heat transfer, U, or the heat transferred per sq. ft. per hr. per deg. difference in temperature from air to air

$$U = \frac{1}{\frac{1}{f_i} + \frac{1}{f_o} + \frac{1}{C}} \quad \ldots\ldots (7)$$

Equation (6) may be reduced to the following form:

$$H_2 = \frac{U}{f_o}\left[eI + f_o(t_o - t_i)\right] \quad \ldots\ldots (8)$$

For the total area, A, of wall involved,

$$H_s = H_2 \times A = \frac{AU}{f_o}\left[eI + f_o(t_o - t_i)\right] \quad \ldots\ldots (9)$$

The values of the coefficients used in Equation (9) were $U = 0.25$, (Guide 1934, p. 85, Table 10, Wall No. 41A), and $f_o = 6.00$, (Guide 1934, p. 82, Table 7). Values of e for clean white paint ranging from 0.20 to 0.30 were given by different authorities, and a value of 0.40 was used as being representative of weathered white paint stained with soot and dirt. It was determined by observations made at the Research Residence that when the sun was shining on a wall only about 50 per cent of the wall area was actually exposed to the sun's rays. The balance was shaded by shutters and other obstructions. For the south and west walls the total areas of the wall surfaces were 530 and 396 sq. ft. respectively. The actual sun-exposed areas were therefore 265 and 198 sq. ft. At 2 p. m. on June 27, the values of sun's intensity on the south and west walls, read from Fig. 38, were 63 and 144 B.t.u. per sq. ft. per hr. respectively.

Sample calculation for 2 p. m., June 27, 1934:

South wall,

$$H_s = \frac{265 \times 0.25}{6.00}\left[0.4 \times 63 + 6.00\,(97.1 - 79.9)\right] = 1420 \text{ B.t.u. per hr.}$$

West wall,

$$H_s = \frac{198 \times 0.25}{6.00}\left[0.4 \times 144 + 6.00\,(97.1 - 79.9)\right] = 1330 \text{ B.t.u. per hr.}$$

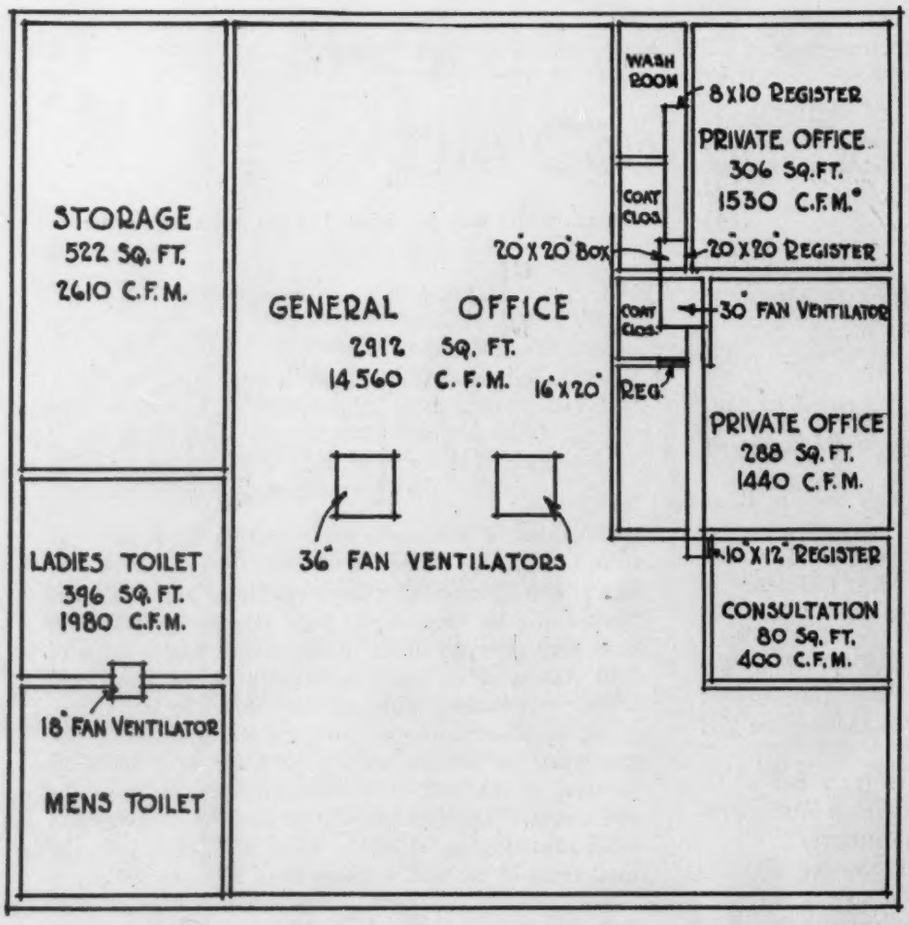
Total heat transfer through walls exposed to sun = 2750 B.t.u. per hr.

Heat Transmission Through Windows and Doors Not Exposed to Sun

The heat transmission through windows and doors was calculated from Equation (1), Section 2. For windows the valve of U used was 1.13, (Guide 1934, p. 92, Table 8). This value of U applies to the window as a whole including sash and any separating strips between panes. All windows were shaded by awnings, and the indirect sun effect was obtained by using the glass area alone of the windows on the sides exposed to the sun, as explained in Section 5. Hence the area used in Equation (1) was obtained by subtracting the total area of the glass alone on the sun-exposed side from the total area of the openings for all windows.

(*Continued on page 78*)

*Harding, L. A., and Willard, A. C., "Mechanical Equipment of Buildings, Vol. I," second edition, p. 248.



Cooling by Ventilation

By Paul R. Jordan
Indianapolis, Ind.

An American Artisan Cooling Study

RECENTLY specifications were invited for ventilating and cooling an office mostly in the winter, as summer cooling with night air, coupled with necessary heat removal, was expected to take care of ventilation needs during the hot season.

Of interest—the owner has refrigerating equipment, but is not inclined to move it from the abandoned office room into the new offices. His statement is that the machine maintains coolness and a low relative humidity during hot hours, but is blamed for colds and other respiratory troubles by the office help. This adverse effect may be due to the maintaining of an excessively low humidity, but that, of course, is purely a matter of speculation. The established fact is that they do not like it, and are now turning to air cooling.

Problems of Design

This office is on the third (and top) floor of a substantially constructed brick and concrete building. It has outside windows on all sides. A ceiling of acoustic material is suspended about 2 feet below the roof and 11 feet above the floor. It woould seem that this roof space would make an ideal grouping chamber, with exhausting units at any convenient point on the roof, and registers and flues tapping into the ceiling from the rooms wherever needed. There are objections to this kind of layout, in that the acoustical material, being porous, will naturally act as a filter, straining the dirt out of the exhausting air. This is not only bad for the decorations, and unsanitary, but affects the acoustic properties of the material as the pores become clogged and the material becomes solidified. This idea is therefore abandoned.

The roof is insulated in addition to the insulating value of the acoustic ceiling material. This, because the roof is a heavy concrete slab, makes for a slow absorption of solar heat through the roof and ceiling. It will only be necessary so far as the roof space is concerned to arrange for the removal of accumulated solar heat. It is possible that the roof space formula, namely 80 cubic feet per hour for each square foot of roof area, could be cut in two for this particular job. However, a 36-inch gravity ventilator handling 216,000 cubic feet per hour to take care of their approximately 4,000 square feet of area, figures somewhat better than 50. The roof space formula might not be cut at all if it were not for the fact that the extreme air turnover for the office rooms is needed and the ventilation of the roof space will be handled as an entirely separate zone, in addition to adequate room ventilation.

The entire floor, with windows on all four sides, is partitioned off to give three private offices at the front, two toilet rooms and a small storage room at the back and a general office in the larger space

in the center. The area is, then, divided into three zones, each zone to be handled separately.

One zone will take care of only the two toilet rooms totalling 396 square feet. It is necessary to establish a positive flow of air toward these rooms, and to make certain that there will be no flow of air away from them toward the other rooms. On the basis of 300 cubic feet of air per hour for each square foot of area (5 cubic feet per minute) these rooms will require an exhaust of 1,980 cubic feet per minute. An 18-inch fan ventilator with a rated capacity of 2,025 cubic feet per minute will make an ideal exhausting unit. It can be booted directly up from both rooms from a 14 x 18-inch grille in each room. Fan and motor will be rubber mounted on three-point suspension and sound insulated, in order that neither motor hum nor base drumming will be conducted either to the building structure or to the rooms below. This unit having a 24 × 24-inch base can be set over a curb 2 inches wide, including flashing, and leave an inside curb opening 20 × 20 inches.

If the fan ventilator is set directly over the grilles, it will be necessary to provide mufflers. This can be taken care of with the installation of perforated metal, staggering the perforations.

Inasmuch as outside appearance is a consideration, the fact that the entire device will set only 44 inches above the roof, an item if some importance.

General Office Zone

The small storage room and the large main office can be handled as one zone. It is possible that later developments may bring out the use of this storage room as office space. Therefore, it can be handled satisfactorily by bringing air through it from the outside windows toward the exhausting units in the general office room.

This storage room having 522 square feet of area will require 2,610 cfm. The general office having 2,912 square feet of area will require 14,560 cfm. This gives us a total of 17,170 cfm for the two rooms.

There will be some advantage from the standpoint of flexibility of operation, in using two exhausting units. While it is true that the best of results from the standpoint of distribution can be had with the use of a single exhaust from the center of the larger room, drawing air toward it from all directions, two exhausting units placed close together at the center will give substantially the same results. These should be placed within 12 feet of each other so that a lateral distance of 6 feet will be all that is necessary for each to draw, along the line between the two units.

Two 36-inch fan ventilators, each with a rated capacity of 8,450 cfm or a total of 16,900 cfm will fit very nicely. These can be operated—either both fans together; or one of them at a time; or one or both on gravity; provided each is equipped with separate electric controls, and with a manually operated damper.

Gravity action should give sufficient relief from accumulated heat in summer, either solar or artificial light, during the day, under ordinary circumstances. If, however, it becomes necessary to furnish a greater exhaust for ceiling heat, one fan can be turned on, and the other used as an intake while keeping the windows closed. This will bring about a maximum of exhaust with a minimum of heat absorption while the outside air is hot, conserving the coolness of the building structure while at the same time getting rid of an excessive accumulation of heat underneath the ceiling. Stated another way, it will give an air circulation at the ceiling, leaving the floors and walls practically untouched.

These units will be booted through the roof space down to 42 × 42-inch grilles in the room ceiling. Motors and fans must be completely isolated on cork mountings. They must be slow speed, for quietness. The overall height is kept down to approximately 5 feet.

Private Office Zone

The private offices will be handled in a separate zone because they are permanently partitioned off from the general office, and because furthermore on account of a greater heat loss due to north and west exposure, it is advisable to provide for winter ventilation with heat conservation. Duct space is at a premium, but sufficient space for risers can be taken from within the clothes closets, and a small riser can be run up the corner of the general office and connected through the partition into the consultation room. These risers can of course be decorated to simulate columns.

These three rooms having floor space of 306 square feet, 288 square feet and 80 square feet call for exhaust capacities of 1,530 cfm, 1,440 cfm and 400 cfm respectively, or a total of 3,370 cfm. These can all be hooked up to one fan ventilator located about centrally between the various registers it handles. An 8 × 10-inch ceiling register in each of the coat closets and the washrooms will be adequate. A 16 × 20-inch riser equipped with a 20 × 20-inch register at both the floor and ceiling will take care of the larger private offices.

The private office in the middle can be taken care of with a 16 × 16-inch riser with a 16 × 20-inch register at both floor and ceiling. The consultation room requires a 9 × 10-inch riser equipped with a 10 × 12-inch register at both floor and ceiling. These registers should all be of the louvred type so as to give complete control over the entire system. The registers at the ceiling will be kept open during the summer and closed during the winter.

While the total air delivery required on the basis of 5 cfm for each square foot of area, is only 3,370 cfm, a 30-inch fan ventilator, with a rated capacity of 5,625 cfm will insure a larger exhaust in these private offices than in the general office because the glass area admitting solar heat is proportionately much greater.

It may be advisable to leave the control of office ventilation largely in the hands of the occupants.

(*Continued on page* 84)



Air Conditioning the New 200 M. P. H. Transports

By J. F. McGuire
Chicago, Ill.

PASSENGERS flying over winter in United Air Lines, new 200 mile an hour transport planes will pass in fifteen hours from sub-zero temperatures of winter in the East to summer in California, all the while enjoying the comfort of 70° conditioned air made possible by a special lightweight pressure indirect steam heating and ventilating system capable of an output sufficient to heat a five room house, yet weighing only 140 pounds, including the eight quarts of water necessary for its operation.

The cabins of these luxury club-car planes, in which only 14 seats are placed in a 21-passenger type cabin, and of its 21-passenger planes to be used on shorter flights will be ventilated by utilization of the plane's three mile a minute speed to obtain a change of air without need for circulating devices. A supply of freshly heated air, the temperature of which is thermostatically controlled, with optional manual control, will be introduced into the cabin at a flow varying from 1200 cubic feet per minute under summer conditions, to give a complete change of the air in the cabin every minute, to 400 cubic feet per minute for a complete change of air every 4 minutes with adequate preheating during severe cold, more than is necessary for the same number of people in a closed compartment on the ground.

Pure as is the atmosphere of the upper altitudes, the air for the ventilation of the cabin is admitted through a vent in the nose of the fuselage, regulated by the pilot, and is transmitted through individual manually controlled ducts to each seat, to the pilots' compartment, lavatory and galley. In order to insure uniform inside temperatures, however, the fresh air is preheated by passing over the coils of a tubular type radiator located under the flooring in the forward part of the cabin. A portion of the incoming air may be by-passed directly to a mixing chamber in the warm air line to mingle with the heated air for further moderation of its temperature and humidity. Regulation of the amounts of heated and unheated air entering the mixing chamber for distribution to the individual heating ducts is made by levers located in the cabin and operated by the stewardess. An additional duct system, connecting directly with the cold air line near the intake valve operated by the pilot, delivers cool air to a second set of outlets which passengers may open or shut at will.

Exhaust gases are employed to generate the steam for the system by means of a flash type boiler, tubular in construction, which is set in the exhaust line of the right engine of the plane. At temperatures in the vicinity of 1700° F the gases pass over a web of stainless steel tubing welded into headers in the walls of the exhaust line and extending forward and toward the rear in concentric parabolas to permit maximum absorption. Water fed to the boiler from an eight quart reservoir in the forward baggage compartment of the plane is instantly converted into steam at these high temperatures and is taken off to the radiator under the flooring inside the cabin.

The return lead from the radiator communicates with the boiler through a drain manifold located in the lowest point in the steam line and draining by gravity to the boiler, thus eliminating need for a condensation box. Release valves located at the water reservoir and in the steam line close to the boiler, maintain the steam in the system at a fixed operating pressure of 25 pounds.

To supplement the steam heating systems of the new planes, United continues to operate mobile air-conditioning units at all principal airports for a preliminary

(*Continued on page* 82)

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AUTOMATIC CONTROL INSTALLATION with "GENUINE DETROIT" PACKAGE UNITS

Use this handy Thermostat and Relay Package Unit for the installation of unit heaters, coal blowers, hot water circulators, etc. It offers you the advantage and economy of modern low voltage equipment at approximately the cost of a high voltage installation.

Included in this Package are the "Genuine Detroit" Two-Eleven Thermostat with compensator, the No. 298 Relay, 35 ft. of 3-wire cable, and a supply of insulated staples.

The Two-Eleven Thermostat is not only extremely sensitive, but it provides easy adjustment of heating cycles over a wide range to compensate for any local conditions that may be encountered.

Another Package Unit of "Genuine Detroit" Controls, now available for the quick installation of gas burners for boilers or furnaces, includes the Two-Eleven Thermostat, the No. 688 Solenoid Gas Valve (pipe size either ¾" or 1"), a transformer, 35 ft. of 3-wire cable and a supply of insulated staples. Also available with "Genuine Detroit" Limit Controls for either steam, hot water, or warm air.



Write for Bulletins 161 and 162 for a complete description of these packaged controls.

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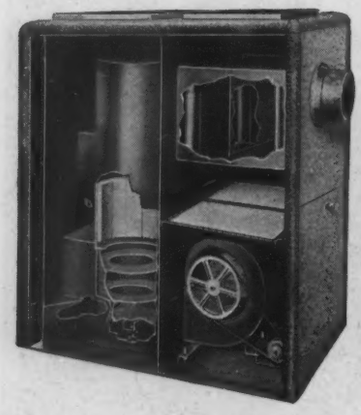
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Forced air circulation—air filtration—automatic humidification—automatic heat control—has an output of 95,000 BTU, yet the floor dimensions are only 32" x 53". Double front on outer casing, conceals operating mechanism behind outer door.

Welded heavy steel construction—fire brick lined fire chamber—long gas passage. Outside is finished in two shades of ripple green enamel.

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Dear Sir:
Please send complete information about
☐ Junior-Aire ☐ Model 100-A Furnace
☐ Model 100 Furnace ☐ Water Heater
Firm Name .....
City .....
State .....

Cooling By Drying

(*Continued from page 47*)

ertion, which naturally works up much bodily heat and perspiration. On the other hand, the patients, who undress and don cotton gowns, to be worn during the treatments, would feel chilly at a comparatively moderate temperature until the treatment began to warm up their blood.

"However," says Dr. Perrin, "only on one particularly hot, humid day last summer did I perspire while giving treatments, and the air conditioning soon took care of that. My patients stated that they felt very comfortable."

These comfort conditions were maintained consistently throughout the summer and winter. Performance charts for two months during the summer for temperature and humidity variation show that conditions were mantained uniformly for July and August (1936), despite some exceedingly torrid periods, with sudden throw-backs caused by east winds and showers to low summer temperatures with high outside humidity.

Conditions Encountered

Because of the excess performance, the proportion of outside air to re-circulated air is kept to about ten per cent, although in at least one other similar installation near Boston, the fresh air intake is between 20 and 25 per cent. Equivalent refrigeration effect of the Perrin dehumidification equipment is approximately three tons.

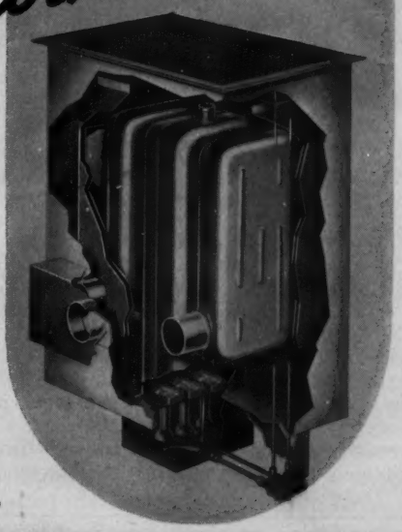
Treatment or operating rooms are each about 8 x 10 feet, just large enough for the patient, the operating table and the doctor. In one case a single outlet serves two rooms, being split at the partition, but in all the other rooms there is an outlet to each room, with returns through floor grilles to ducts along the cellar ceiling. Location of returns was not a matter of choice, but necessitated because of heating returns already in place. This kept down construction costs and avoided damage to walls.

The house is 2½ stories high, with mansard roof and a master's bedroom in an extension having a metal roof. The rest of the roof is slate. This room is well insulated, however, and just as comfortable as the others. Conditioned air is supplied only to the two lower floors, the attic rooms not being included.

Located on a corner lot, the house is exposed on two sides to wind, and in summer is exposed on three sides to the sun. Additional heat is reflected and radiated from the asphalt pavement on Massachusetts avenue, along the front of the house.

Heat is supplied by a Bryant No. 3F unit, gas fired, for winter air conditioning, with a pan type humidifier. A Bryant No. 6 silica gel dehumidifier dries for summer cooling. A 24-foot well driven in the yard with two Minneapolis-Honeywell valves for controlling the flow of water to the main and after coolers; a Fairbanks-Morse electric pump for deliv-

Look Again . . . YOU'RE LOOKING AT Greater Furnace Sales!



The new Payne Floor Furnace has arrived with terrific impact that is demolishing old sales records! Little wonder! It embodies eight major, honest-to-goodness improvements that are potent weapons in anybody's sales language!

1. New Streamlined Heating Element
2. New Rigid Unit Assembly
3. New Lighting Arrangement
4. New Burner Design
5. New Floor Grilles
6. New Air Flow Feature
7. New "Unitized" Burner Assembly
8. New Gas Valve and Manifold

And behind this great new Payne Floor Furnace are national advertising, national approval and a national swing to Payne! Write for complete details.

Payne

FURNACE AND SUPPLY CO., INC.
BEVERLY HILLS • CALIFORNIA



BE SURE YOU'RE RIGHT --THEN GO AHEAD!

There's great satisfaction in an installation of Tuttle & Bailey Registers for Air Conditioning work! Because you can be perfectly sure that the installation will function properly and according to plan when it is complete. Tuttle & Bailey have approximated actual operating conditions in their laboratory and have made it possible for you to select exactly the right material for every job you run up against. The Airline Register, for example, is scientifically designed to answer many problems of proper air distribution and air throw. It provides fixed air deflection, is modern and attractive and its close mesh effectively covers the duct opening.



THE AIRLINE REGISTER

Tuttle&Bailey engineers have tested Airline registers for air distribution in their laboratory. The results of these tests are available to you - - so that you may be perfectly positive of the proper constructions for every job.

See Tuttle & Bailey — FIRST

T & B
TRADE MARK

TUTTLE & BAILEY
Incorporated
NEW BRITAIN, CONN.

NEW YORK CHICAGO BOSTON PHILADELPHIA

ering the water from the well to the surge tank, and Friez Comfortrol control instruments complete the equipment.

Waste water, after cooling, in summer, instead of flowing to the sewer, can be diverted by means of a two-way cock into a pipe for hose connection outside the house, for watering the lawn. In winter the well water is shut off and the small amount of water required for humidification is taken from the city supply.

When necessary the system is operated on hot nights as well as during the day. Charts show average inside humidity in winter about 35 per cent and in summer 40 to occasionally up to 45 or 50 per cent. The house has single windows.

In planning the installation some slight variation from a standard layout had to be made, owing to the owner's wish to use the round ducts of a former warm air, gravity heating system. These were used for distribution, with individual round pipes from the plenum, except for one trunk duct which was installed. New rectangular ducts were used for the returns. When summer cooling was added, the same ducts were utilized, but dampers were provided to shift over from the winter system to the summer cooling.

Operating Conditions

In summer the air leaves the dehumidifier at about 140 degrees F. It passes through the dry cooler and then through the main cooler, the dehumidified air passing from the dry air cooler at about 85 degrees. From the cooling coil it goes to the room at about 78 degrees, forced by a fan with a total capacity of about 2500 cfm. In winter this volume is reduced.

When checks and test were made during July and August, 1936, the total cost, including gas and electricity was found to be $28 for the two months, or which $17 was for gas and $11 for electricity. This covered the current for operating the pump, all controls, fans and motors. Water pumping is figured at three cents per 100 cubic feet, estimated. This year, 1937, the summer cooling was started the last of May and operated continuously for much of the weather in June was such that the dehumidifier was worked to capacity. The apparatus is still performing better than its rating, according to Mr. McCrea, and operating costs average about the same.

◆

Isaac A. McVay Dies

The death is reported of Isaac A. McVay, president of the Washington Sheet Metal Works, Seattle, Wash.

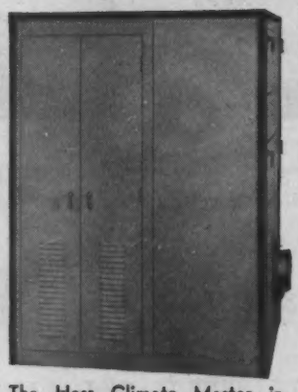
◆

Fromm Buys Into Hughes-Conway

Adolph W. Fromm, formerly in the heating, roofing, and sheet metal business in Chillicothe, has purchased the interest of V. M. Conway in the firm of Hughes-Conway, Inc., 415 N. Columbus St., Lancaster, Ohio. He is president and general manager of the new concern. H. H. Elliott is vice president, and Pauline Thompson is secretary.

The company will carry a complete line of air conditioning units, warm air furnaces, boilers, blowers, circulating fans, conversion burners, gas and steam unit heaters, and paint in addition to their sheet metal work, roofing and siding.

HESS EQUIPMENT
FILLS EVERY REQUIREMENT TO INCREASE BUSINESS AND PROFITS



The Hess Climate Master includes the Hess Automatic Oil Burner and controls, also centrifugal blower and filters, all under one casing, attractively enamelled.

- Prices are low—for superior quality and value.
- Attractive finance plan—36 months—no recourse, no holdback.
- Real dealer cooperation—territory protection—free plan service—free attractive literature for dealers' help in selling.
- Hess Welded Steel Furnaces, for any fuel, have many quality features, are different and better. Why compete with mail order houses with ordinary types?
- The Hess line is complete, including automatic oil burners and coal stokers, furnaces for any job—large or small.
- Thousands of burners and stokers are being sold for homes. Any dealer can sell them and increase business and profits.

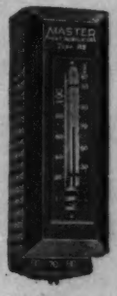
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HESS WARMING & VENTILATING CO.
FOUNDED 1873 1211 S. WESTERN AVE. CHICAGO, ILL



For a century the coming of a comet has been predicted and, upon the minute, it blazes its fiery way across the sky. And the mighty telescope had already been directed at the precise area where it was expected to appear.

Precision is the outstanding feature of Master Heat Regulators. They respond instantly to changes in temperature as little as one degree. Architects, contractors, dealers and users are enthusiastic over their dependable performance. Their precision and reliability are the result of over twenty years constant effort to build the best.





Type B 22 Dealers' Cost $14.10

The ideal, low cost heat regulator for small homes. So staunchly is it made that it outlasts the heating plant. The Master is listed as standard by the Underwriters' Laboratories.

Write for Complete Information

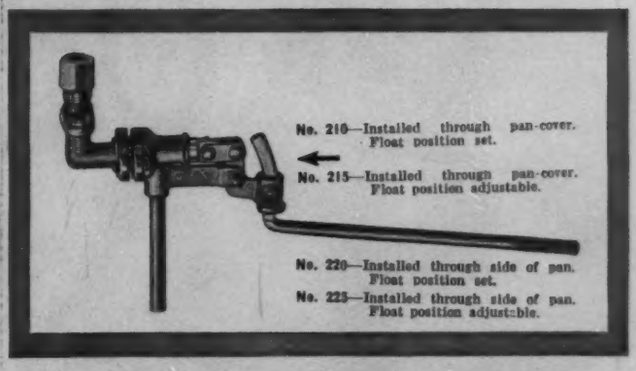
WHITE MANUFACTURING COMPANY
2362 University Ave., St. Paul, Minn.

Makers of the famous Type B144, the Original Gradual Control Heat Regulator

MASTER HEAT REGULATOR

THIS M·VB

HUMIDIFIER VALVE brings any warm-air furnace UP-TO-DATE



- **ENHANCES YOUR REPUTATION—**
- **BRINGS YOU GOOD PROFITS!**

Here's an *automatic* humidifier valve—of typical M-VB quality and design—that will get the most in efficiency and comfort out of any warm-air furnace. It comes in four numbers—one to fit any type of water-pan construction.

The entirely automatic operation maintains the correct water level at all times. Moving parts can't corrode or stick, because they are all clear of the water. The valve-plunger is heavily chromium plated, seating against a special washer that resists heat and live steam.

We pack this valve with full instructions in a neat box. All parts for a complete installation are included: 1) the valve; 2) complete strap-valve assembly to fit ⅜", ½" or ¾" IP size pipes; 3) 10 feet of ¼" 20-ga. soft copper tubing; 4) copper float.

Get the whole story on this modern M-VB item from your wholesaler, or write for free descriptive booklet to the address below.

M·VB

MORENCY-VAN BUREN DIVISION
Scovill Manufacturing Company
STURGIS MICHIGAN

*Complete stocks also maintained at Waterville, Conn., and San Francisco, California.

A COMPLETE LINE OF FLOAT VALVES



A COMPLETE LINE
for Heating and Cooling

The Aerofin line of light-weight fan system, heating and cooling surface offers everything, that architects, engineers and heating contractors need. It embodies in its design, advanced features that anticipate problems met with under practical operating conditions. That is why it is the dependable choice of the leaders in air conditioning, heating and ventilating.

More Aerofin heat exchange surface is sold than any other type—more than 45,000,000 feet of it since Aerofin was first introduced. Forty-five million feet of experience is in the manufacture of Aerofin.

Investigate Aerofin — today. Send for descriptive literature. Our engineers offer you a technical service which will help you solve any problem. Take advantage of it. There is no obligation.

AEROFIN is sold only by Manufacturers of Nationally Advertised Fan System Apparatus. — List upon Request

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850 Frelinghuysen Avenue
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Night Air Cooling

(*Continued from page* 49)

cent greater power input as shown in Table 1. Obviously, the air circulation obtainable with the basement fan is restricted and unless the fan is selected for summer requirements it would be advisable not to arbitrarily force the fan and motor in the forced-air heating unit.

In this connection, with the very rapid increase in the demand for summer cooling, the writer believes that all forced-air heating units should be so designed that a larger size fan can be inserted if the occasion demands. In other words, if in a given unit space accommodation is made for a 14-inch fan, the casing should also be made adequate in size to handle the next larger sized fan. Invariably the designer who figures an installation for both summer cooling and winter heating finds that although

Table 1.

Approximate Increase in Power Consumption Accompanying Increase in Fan Speed (Using Same Duct System and Same Fan)

Increase in Fan Speed in Per Cent	Increase in Power Requirement Is Per Cent
5	16
10	33
20	73
25	95
30	120
40	174
50	237
60	310
70	391
80	483
90	586
100	700

the heating unit may be adequate, the fan is too small to handle an additional resistance for coils, etc. of from 0.10 in. to 0.18 in. The use of foresight by the manufacturer at this stage of the development will be well worth while.

The Complete Air Circulation System

From the preceding discussion it is apparent that night air cooling may be accomplished in any fashion to obtain any desired result. The most complete air circulation system is one that combines the advantageous features of both the basement fan and the attic fan. This unit would consist of an attic fan to circulate at least 15 air changes per hour during the night and a basement fan to recirculate the air in the house during the day. The attic fan would draw through the house copious quantities of cool night air for a period extending from approxmately 7 p. m. to 7 a. m. At 7 a. m. the attic fan would be stopped and the windows would be closed. If no air recirculation is provided in the house, and in particular if no fresh air is added, the air tends to become "stale" and "dead" and the home-owner will not be satisfied with the resultant air conditions. The basement fan in the forced-air system should be turned on at 7 a. m. and some quantity of fresh air should be drawn into the house. In the Research Residence tests it was observed that one air change per hour of outdoor air was sufficient to preserve the freshness of the in-

What more could be said?

We have used your filters "exclusively" for five years with satisfactory results.

Hosea Campbell
President.

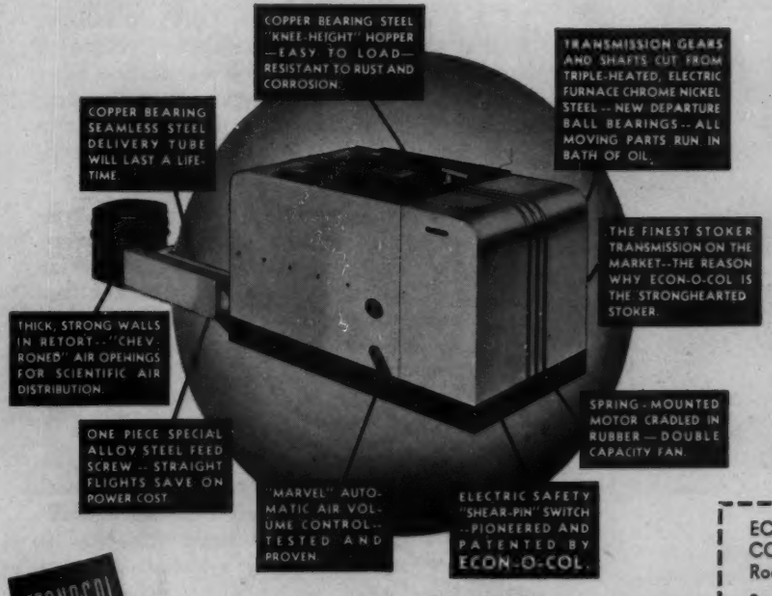
CAMPBELL HEATING CO.
DES MOINES, IOWA..



AMERICAN AIR FILTER COMPANY
INCORPORATED
113 CENTRAL AVENUE LOUISVILLE, KY.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AAF
FURNACE FILTERS

BE PROUD OF THE STOKER YOU SELL TO YOUR CUSTOMERS



Get your share of the fast-growing stoker business with ECON-O-COL. We will guarantee that feature for feature you cannot find a finer product in appearance, performance, or efficiency. It's a stoker you'll be proud to install in your own home — or sell to your best customers. And it's backed by one of the most complete, smashing dealer programs in the industry. Want the details? Send coupon today!

ECON-O-COL
The "Stronghearted" Stoker. Made by ECON-O-COL STOKER DIVISION of COTTA TRANSMISSION CORP., ROCKFORD, ILLINOIS.

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Get this new broadside showing the new dealer helps and the new ECON-O-COL "Streamline" model. It's a REAL "SHOWDOWN" on stokers.

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door air for normal residence occupancy and usage. In this complete installation air circulation is maintained continuously during the 24-hour period and both fans are operated under the most satisfactory conditions.

Obviously, for residences not equipped with the basement fan the indoor conditions during the daytime will not be as satisfactory as when daytime air recirculation is provided.

As has been indicated in the previous discussion, the basement fan alone will provide adequate recirculation of the air in the daytime and a partially satisfactory night cooling circulation at night. If greater night cooling is desired an attic fan should be added. If complete control of indoor temperatures is desired, some form of cooling unit can be added to the existing duct system.

Summary

The formula for keeping cool consists of:

a. Circulate copious quantities of cool night air during the entire night until not later than 7 a. m.

b. Close the house and start recirculation of the indoor air, adding sufficient outdoor air to reduce odors and smell.

c. Keep the house closed and keep out the sun. Install awnings to reduce the sun load, especially on the east and west exposures. Insulate the house to reduce the rate at which the house heats up.

d. In the evening open up the house and start the night air cooling process. Keep the air moving and keep cool.

Table 2.

Cu. Ft. per Minute Required for Desired Number of Air Changes

Air Changes Per Hour	Cubic Feet per Minute. per 100 Cubic Feet of Space
1	1.67
2	3.33
3	5.00
4	6.67
5	8.33
6	10.00
8	13.33
10	16.67
12	20.00
14	23.33
16	26.67
18	30.00
20	33.33
25	41.67
30	50.00
35	58.33
40	66.67

Note:—In order to obtain the C.f.m. required for any given number of air changes, multiply the hundreds of cubic feet of space.

Example:—Required number of air changes per hour = 12. Space to be ventilated = 17,500 cubic feet, or 175 units of 100 cubic feet per unit. C.f.m. per 100 cubic feet of space, from table = 20.00. Total C.f.m. required = 20 times 17 = 3,500 C.f.m.



REGULAR EQUIPMENT

Furnace . . Furnace Casing . . Blower Cabinet . . Blower Motor with variable speed drive Blower Switch . . Filters . . Humidifier

PROFITS?

. . . AND HOW!

IT'S a waste of time to tell you fellows that the RYBOLT line always returns a handsome profit on *every* installation . . . but maybe you aren't aware that the new Air Conditioning Unit No. 600A7 can jump up the profit side of your ledger a hundredfold.

Ultra Modern in appearance, sturdy in construction and more economical in operation, it has the tried and true steel Rybolt as its heating element. Naturally this means that every advantage associated with up-to-date warm air furnaces of the steel type, such as quick response to firing, ease of cleaning, and gas tight construction will be found at its best in the model.

You're always looking for a live wire heating unit to start off a successful season with . . . and now your search is ended. Write for particulars and we'll show you how to lay the ground work for a successful campaign this Fall.

THE RYBOLT HEATER CO.
ASHLAND -:- OHIO



The Improved COOK THERMOSTAT

You will get a new idea of temperature control when you witness the performance of the improved Cook Thermostat.

Delicately sensitive to temperature change! Powerfully accurate in its ability to hold the temperature to the thermostat setting! Precise action that means more comfort, smoother furnace operation, greater economy. A product for you to sell. A sales appeal that rings true and makes good. And priced so you can sell it in volume at a profit.

You will want full details about the improved Cook Thermostat and Heat Control, its price and its attractive selling plan. Write today.

COOK

COOK CONTROLS

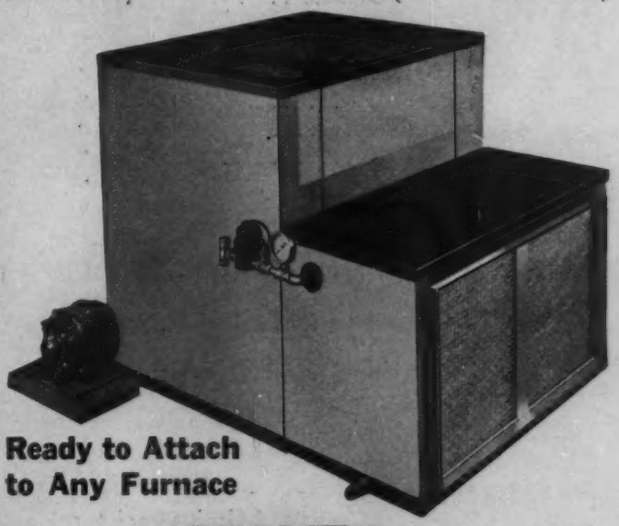
THERMOSTATS—FURNACE LIMIT CONTROLS
ZONE CONTROLS—BLOWER CONTROLS

COOK ELECTRIC CO.
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NATIONAL

4 in 1 AIR CONDITIONING UNIT for WARM AIR FURNACES

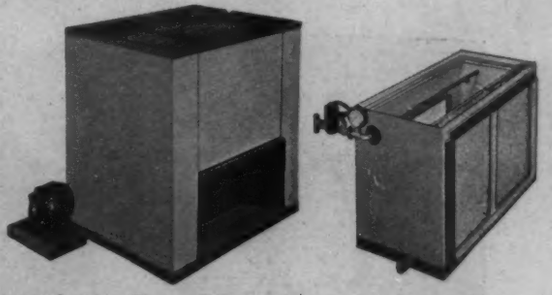
Circulates — Filters — Washes
Humidifies — Cools (in Summer)



Ready to Attach to Any Furnace

QUALITY — AT A PRICE THAT SELLS

Every house with a warm air furnace is a prospect for the year-round comfort given by National Home Air Conditioner, the complete air conditioning unit for homes. It filters out the finest dust and hay fever pollens—washes—humidifies—ventilates, giving 100 per cent pure, clean, healthful air at all times. Made in four sizes to fit every home—1600, 2400, 3200, 4000 C.F.M.



Made in Two Parts The blower and filter unit can be installed without the air washer, which may be added later if desired.

AGENTS — JOBBERS — DEALERS

Besides the items shown above, National makes a complete line of equipment with one name plate and one guarantee, including blowers of all sizes and types, propeller fans, penthouse exhausters, unit coolers, attic fans, air circulators, etc. Write today for our catalog and information on 100 per cent dealer policy.

NATIONAL FAN AND BLOWER CORP.
541 W. Washington Boulevard, Chicago, Ill.

Well Water Cooling

(*Continued from page* 51)

.24 × 10 = 7,840 B.T.U./Hour, 900 C.F.M. × 60 × .075 = 4,050 Lbs. air/Hour, 4050 × .24 × 15 = 14,600 B.T.U./Hour to cool air brought in by exhaust fan.

Sensible Heat

East Wall	18,200	B.T.U./Hr.
Other Walls	7,840	"
Outside Air	14,600	"
73 People at 225	16,400	"
Lights	5,120	"
Coffee Urn	16,000	"
Dish Warmer	6,000	"
Total Sensible Heat	84,160	B.T.U./Hr.

256.3 Grains moisture per lb. of 95° F. dry air (at saturation)
155.8 Grains moisture per lb. of 80° F. dry air (at saturation)
256.3 × 38% (R.H.) = 97.39
155.8 × 60% (R.H.) = 93.48

3.91 Grains moisture removed per lb. of air in passing through cooling coil.

4050 lb × 3.91 = 15,835.5 grains moisture per hour removed from incoming air.
73 people × 1200 = 87,600 grains moisture per hour given off by 73 people.

103,435.5

(use 1000 B.T.U.'s as latent heat per lb. of moisture) (7000 grains moisture per lb.)

$\frac{103,435}{7000} \times 1000$ B.T.U. = 14,776 + B.T.U.'s total latent heat load.

Tot. sensible heat = 84,160
10% Safety Factor 8,416

h = 92,576, (Sensible Heat Load) B.T.U./Hr.

Sensible Heat Load 84,160
Latent Heat Load 14,776

98,936
10% safety factor 9,893

H = 108,829 = Total Sensible and Latent Heat Load B.T.U./Hr.

Gallons of Water Required

H = Total heat load (including latent heat).
W1 = final water temperature at cooling coil.
W2 = entering water temperature at cooling coil.

New PEERLESS CLEANAIRE BLOWER

★ READY TO INSTALL ★ COMPLETELY ACCESSIBLE ★ QUIET IN OPERATION
★ NEAT, COMPACT CABINET ★ STURDY CONSTRUCTION ★ HIGHLY EFFICIENT



Especially adapted for "night cooling"

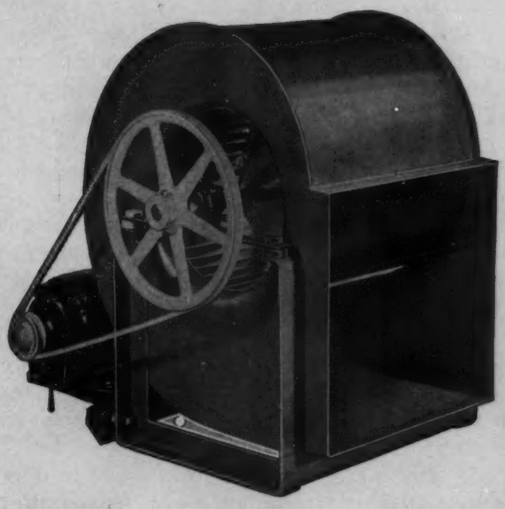
Here is the biggest value you can find in a Blower—a unit built to give complete satisfaction to your customers and priced to make you money. . . . Motor and driven assembly engineered for efficient, quiet operation. Blower wheel perfectly balanced and designed for maximum air circulation. Best type filters—unusually effective in removing dust from the air. Automatic louvers. Large access panel. Felted flange for connection to furnace. Knockdown construction. Available in a complete line of sizes. Write for illustrated folder and prices.

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INDIANAPOLIS, INDIANA

PROVIDES FILTERED "JUNE" AIR THE WHOLE YEAR 'ROUND

Blower Wheels, Housings, Pulleys and Complete Assemblies

Manufacturers everywhere are including LAU blower wheels, housings, pulleys and complete assemblies as standard equipment with casings of their own fabrication.





Guaranteed Certified Ratings

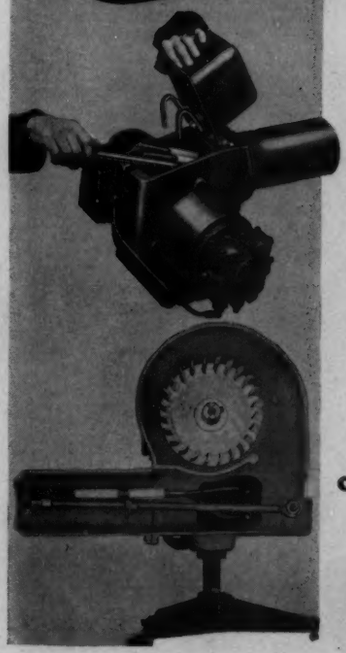
All units tested in exact accordance with the A. S. H. & V. E. Blower Test Code. Investigate today! A postal card will bring you complete performance data, catalog and prices that are surprisingly low.

The Lau Blower Company

Dayton, Ohio

A Burner for Every **HEATING NEED**

BETTER ENGINEERED, BETTER BUILT!



Here are the burners that leading furnace and air-conditioning manufacturers are using. The simplest and most efficient oil burners built—"it's all in the design." Performance records prove lowest operating cost. Standard, interchangeable parts give it unequalled adaptability that manufacturers need. Easiest servicing ever—and least of it.

PET OIL BURNER

Removal of one screw gives easy access to electrical assembly. Low first cost—amazing economy. Fewer parts—standard parts, means fewer, less expensive repairs.

HEAT-PAK COMPACT OIL BURNER

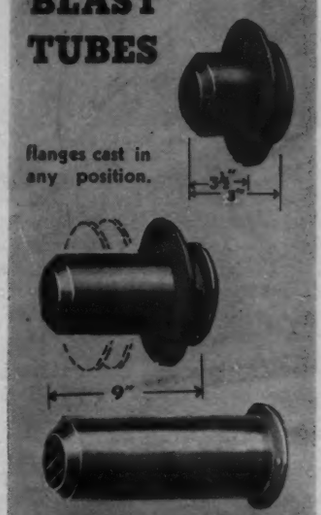
The burner that introduced "compact" to the industry. Ideal for oil-fired units . . . can be adapted to any made. Flange or pedestal mounting—or both, to eliminate vibration. Simple—economical—efficient.

One of the World's Largest Producers

ALDRICH COMPANY
PEORIA, ILLINOIS

of Automatic Oil Burners

Interchangeable
BLAST TUBES



Unequalled Adaptability

Illustrations above show interchangeable blast tubes on which flanges may be cast in any position. For pedestal mounted burners, blast tubes of any desired length are furnished.

This feature "custom-fits" burner to any thickness of combustion chamber wall, yet fits it into smallest space in furnace casing.

Factor of 500 = 8⅓ lb. × 60 minutes.
H = 110,753
W1 = 70°
W2 = 55°

$$\text{Water required} = \frac{H}{(W1-W2) \times 500}$$

$$= \frac{108{,}829}{(70-55) \times 500}$$

= 14.5 or 15 G.P.M.

CFM of Air Required

h = Sensible heat load.
A1 = final air temperature at cooling coil.
A2 = entering air temperature at cooling coil.
h = 92,576 B.T.U.
A1 or final air temperature = 60°.
A2 or entering air temperature = 80°.

$$\text{C.F.M.} = \frac{h}{(A2-A1) \times (60 \times .24 \times .075)}$$

$$= \frac{92{,}576}{20 \times 1.08} = 5270 \text{ (C.F.M.)}$$

Selecting Fan or Blower

With the C.F.M. known, it is only necessary to estimate the amount of air resistance in the duct system and apparatus which you plan to use, in order to definitely select the fan with the correct motor horsepower. Air resistance is measured in inches of water gauge pressure. The friction loss of the duct system is not the sum of the friction losses through each duct, but is the greatest friction loss of any circuit. Obtain from the manufacturer's data on the particular apparatus to be used, the friction loss through the apparatus, or in lieu of actual data, assume the following average losses:

Filters ..... ⅛" to ¼" W.G. Pressure
Cooling Coils ..... ⅛" to ¼" W.G. Pressure
Average Furnace system ..... ⅛" to ¼" W.G. Pressure
Air washers ..... 1/10" W.G. Pressure

Add the apparatus resistance to the resistance of the duct system to obtain the total static or pressure resistance. Then select fan and motor.

Amount of Cooling Coil Surface Required

Use manufacturer's data for selecting the proper cooling coil size. From experience with using well water for the cooling medium, it is suggested that the following recommendations be observed:

1. Air velocity through cooling coil should be held down to 300 to 350 feet per minute. A greater air velocity will prevent the final air temperature from reaching the minimum (approximately within 5° of the well water temperature).

2. Air and water in coil should move in opposite directions and the final air as it leaves the coil should be in contact with the coldest water.

It is often necessary for the air conditioning en-

When Better Furnaces Were Built
ROUND OAK Built Them!

The ROUND OAK "FX" Series Moistair Boiler Plate



Heavy boiler plate furnace, double electric welded permanently gas-tight, with extra large baffled heat radiator. Complete with humidifier, filters, positive centrifugal blower, and controls.

ROUND OAK, ever a leader in furnace quality, now takes the lead with heating plants of amazing beauty. The entire ROUND OAK line is now offered in newly styled cabinets . . . made of extra heavy cold rolled steel . . . gracefully proportioned with rounded corners . . . pleasingly enameled in two and three-toned baked enamel.

Here truly is a line that cannot be equalled in sheer sales appeal . . . offering assured heating performance . . . backed by ROUND OAK prestige.

ROUND OAK, furthermore, offers you unusual cooperation in selling . . . advertising . . . engineering installations . . . financing . . . a complete set-up to help you make more sales, with more satisfied customers and more profits for yourself.

ROUND OAK COMPANY
DOWAGIAC Since 1871 MICHIGAN

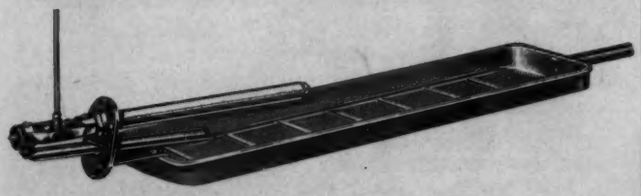
WRITE FOR LITERATURE ON THE NEW ROUND OAK LINE

Round Oak Company, Dowagiac, Mich.
Send new literature describing the Moistair Boiler Plate and other newly styled models, together with details of your dealer cooperation.

Firm Name .....

St. No. ..... City ..... State.....

Humidifier Sales and Profits come easier when you sell . . .



The Humidifier that is *really* Automatic

Right now, the thoughts of scores of home owners in your community are turning to the operating condition of their warm air furnaces. They're determined to have **healthful,** comfortable warmth this coming winter . . . determined to end "desert air" atmospheres in their homes . . . but anxious to avoid damaging condensation on walls and windows. **Fully automatic** humidity control is what they want, and that is what YOU have to offer—when you handle THERMO-DRIP Humidifiers.

A THERMO-DRIP Humidifier, with its bimetallic thermostat projecting into the furnace bonnet, automatically compensates for changes in furnace bonnet temperatures. Increasing temperature means increasing expansion of the thermostat and a corresponding increase in the flow of water. Thus it controls not only the amount of water admitted to the vapor pan but also the rate of evaporation. It is automatic in the true sense of the word . . . makes it positively unnecessary to put up with only mechanical pan fillers and to sacrifice evaporation control . . . banishes guesswork and uncertainty in humidity control.

Your selling job is made easier with THERMO-DRIP in countless other ways. There are no gadgets or gimcracks that require explanations—no instruments or devices to confuse the customer—no electric wiring or other "extras" to burden the cost—and no operating cost or service maintenance. You can present the complete THERMO-DRIP story in plain, understandable terms to operators of any type warm air furnaces.

Investigate now—find out why THERMO-DRIP will open more doors for you . . . why it multiplies your selling opportunities.

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets CEDAR FALLS, IOWA

Manufacturers of

THERMO-DRIP HUMIDIFIERS

ELECTROL

PROVEN PERFORMANCE PROVIDES GREATER PROFITS

For You



$78.00 for fuel oil, last season, automatically heated and air conditioned this house in Scarsdale, Westchester County, N. Y. An ELECTROL DF Warm Air Conditioner was used.

ELECTROL gives so much better service to the home owner, you can justify a better price to him.

ELECTROL'S nearly 20 years of proven performance, guaranteed efficiencies, low operating costs, dependability and lasting quality, make ELECTROL equipment worth more, yet it costs YOU no more than equipment made by other experienced and reliable manufacturers. Get the facts about the ELECTROL proposition to dealers. It's different and profitable.

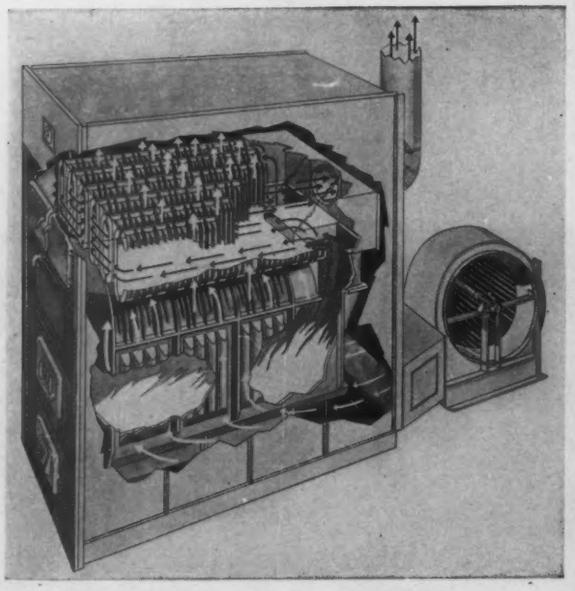
OBI

ELECTROL Incorporated

934 MAIN AVE., CLIFTON, N. J.

The ACME HEATER

"It's in the Fins"



PHYSICAL DATA—LARGE SERIES

Size No.	Dimensions Length	Width	Height	Grate sq. ft.	Heat Surf. sq. ft.	Free Area sq. ft. Min.	Free Area sq. ft. Max.	Wt. Lbs.	Max. Capacity Btu.
7	6'-6"	4'-0"	7'-0"	10.31	260	6.55	10.25	5900	900,000
8	8'-1"	4'-0"	7'-0"	11.91	340	7.73	12.50	7000	1,100,000
9	9'-8"	4'-0"	7'-0"	13.06	430	8.91	14.75	8000	1,300,000
10	11'-3"	4'-0"	7'-0"	14.43	500	15.82	22.62	9300	1,500,000
JUNIOR SERIES									
2	4'-6"	3'-6"	5'-8"	3.9	136	4.7	4.7	3200	350,000
3	6'-0"	3'-6"	5'-8"	6.1	183	5.9	6.9	4800	527,000
4	7'-6"	3'-6"	5'-8"	7.2	230	7.1	9.1	5000	634,000
5	9'-0"	3'-6"	5'-8"	9.3	280	8.3	11.3	6000	800,000

Note: For Automatic Firing Add 10% to Ratings Given.

Burns Any Kind of Fuel

The design of an all cast iron, direct transmission heater, such as the Acme, is not dependent upon the kind of fuel to be used. Any type of fuel may be burned. Suitable grates may be provided so that bituminous, semi-bituminous, anthracite coal, or other solids may be used with equal efficiency. Replacement of grates and linings by proper refractory material permits the use of automatic stokers on oil burning equipment.

Large Combustion Chamber

The Acme Heater provides ample space for the ignition of gases of combustion, regardless of the kind of fuel used. The unusually large combustion chamber, acting as "primary" heating surface, effects a very efficient transfer of heat, because of the great temperature difference between the burning gases inside the chamber and the air passing over the outside surface.

Efficient Radiator Section

Although the heating surface of the combustion chamber is large and efficient, still more heat must be extracted to obtain satisfactory overall efficiency. An inspection of the "phantom view" above will reveal how the gases of combustion enter the rear smoke chamber, flow to the front of the heater, and return again to the smoke-box. It is evident that the gases are held in intimate contact with the heating surface, six times the length of the heater, before they are permitted to escape.

High Ratio of Heating Surface to Grate Area

The radiator tubes are covered with extended surfaces, or fins, typical of those used on indirect heating coils. The long, oval tubes of the radiator provide an exceptionally large heating surface and, when combined with the surface of the combustion chamber, afford a remarkably high ratio of heating surface to grate area.

Balanced Construction

The construction of the Acme Heater provides ample free area and allows proper velocity of the air to be heated. Moreover, this air is brought into direct contact with as much heating surface as possible, resulting in the Acme of Efficiency.

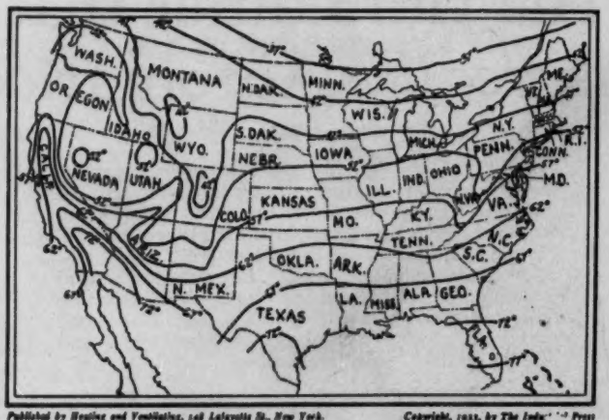
ACME HEATING & VENTILATING CO., Inc.

4224 LOWE AVENUE CHICAGO, ILL.

gineer to know the temperature of surface and well water available in various localities when specifying or designing condensers and cooling equipment. This information is presented in the accompanying charts from Water Supply Paper 520, published by the United States Geological Survey, Department of the Interior, Washington, D. C.

The above map shows the probable temperature of well water at depths of 20 ft. to 60 ft. in the United States. It has been found that, at depths of 30 ft. and greater, the annual seasonal range of temperature of well water does not exceed 1°.

From a study of over 3000 records of ground water temperatures, one observer, C. E. Van Ostrand, has concluded that under normal conditions the temperature of ground water obtained at



Published by Heating and Ventilating, 148 Lafayette St., New York. Copyright, 1933, by The Industrial Press

a depth of from 30 ft. to 60 ft. will generally exceed by 2° or 3° the mean annual air temperature for the locality, with exceptional cases slightly greater. The British Association for the Advancement of Science has adopted as most proable an average increase in temperature of 1° for each 64 ft. of depth. It may be stated that for practical purposes water taken from depths of 20 ft. to 200 ft. will have a uniform temperature of from 3° to 6° higher than the mean annual air temperature.

In considering a well water installation, the temperature of the water available is very important because this determines the final air temperature which can be obtained. All calculations should be based on a final air temperature not less than 5° higher than the entering water temperature. For example, with 53° water the lowest final air temperature that can be obtained practically is 58°. Also remember that a 15° rise in water temperature is about the maximum that can be figured.

Popularity of Trailers

Growth in popularity of the automobile trailer may hasten the day of widespread prefabrication of houses, in the opinion of A. C. Shire, technical editor of "The Architectural Forum."

Regulations — Federal Old-Age Benefits

The Social Security Board has made available copies of regulations governing old-age benefits, particularly those relating to the filing of claims. Establishment of a special field service to facilitate the handling of claims was also announced.

ORDER A MODERN AIRE HEAT RULE

Today!



Only $1.00

Modernaire Heat Rule is designed for simplifying the engineering of forced air and gravity heating installations. There is nothing complicated about its operation and anyone can learn to work it within a few minutes. It complies with the new 1937 Technical code for Mechanical Warm Air Heating Systems. Modernaire Heat Rule is exact in every figure and can be used in any part of the country regardless of climatic conditions. Remove the guesswork in figuring heating jobs . . . order a Modernaire Heat Rule Now. Complete with instructions and supply of data sheets, $1.00.

MODERN AIRE ENGINEERING COMPANY ● **107 S. W. 2nd St. Des Moines, Iowa**

A COMPLETE LINE . . More than 60 Models, Sizes
FREE PROSPECT LETTER SERVICE
NEW 6% TIME PAYMENT PLAN

Today's Straightest-Shooting, Hardest Hitting Program of Dealer Cooperation That's PREMIER



A complete "package" unit available with steel or cast iron furnace equipment. Genuine Premier Quality throughout—streamline cabinet . . . Rock-Wool insulation . . . quiet running Blower . . . automatic control . . . 10 year guaranteed furnace . . . and, moderate price.

6% TIME PAYMENT PLAN . . . NO DEALER RESERVE

EXCLUSIVE FRANCHISE
A SPECIAL DISPLAY PLAN
ADVERTISING . . . A Full Program of Dealer Helps
FIELD ENGINEERING and Sales Service
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You'll find PREMIER a powerful ally in your fight for greater success. For PREMIER really goes to work for you . . . gives you skilled counsel and active assistance that strike straight at the heart of your problems. PREMIER engineers your installations FREE . . . helps you sell . . . gives you a wealth of advertising aids . . . provides a simple new financing plan that gives you ALL your money as soon as you complete the installation. And, best of all, PREMIER offers you today's most complete and modern line of heating and package air conditioning equipment. MAIL THE COUPON FOR THE PROFITABLE PREMIER PROPOSITION.

[National Warm Air Heating and Air Conditioning Week August 22nd through August 28th, 1937]

PREMIER FURNACE COMPANY, Dowagiac, Mich.
Manufacturers of Warm Air Heating and Air Conditioning Equipment

Premier Furnace Co.
Dowagiac, Michigan
We'd like to know how we can make more money with the PREMIER line and PREMIER Dealer Cooperation.

NAME_____
STREET AND NO. _____
CITY_____ STATE_____

Rely on A-P Controls to run Your Air Conditioning Jobs

With increasing frequency, air conditioning installers are reporting better performance from their A-P equipped units.

Reasons for this are found in the care and accuracy with which every A-P control is made — the patience and severity with which it is tested.


No. 73 RB Solenoid

Easy to Service

Leave on the line, remove bottom nut and parts drop into your hand for cleaning and inspection.

Brass forged bodies are used on these valves to eliminate possible leakage.


No. 210 Expansion Valve

AUTOMATIC PRODUCTS COMPANY
2452 NORTH THIRTY — SECOND STREET
MILWAUKEE WISCONSIN



Air-Flo Shutters offer the least resistance in the air stream to your fan or blower.

Tie-rod built inside—protected against weather—partially counterbalances louvers—increases air delivery.

Shutter frame extends beyond louvers—prevents fluttering—keeps out rain and snow—fitted with bronze bearings.

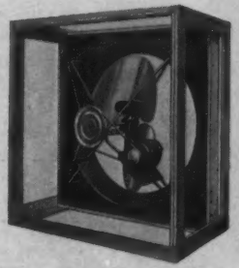
Silent operation—Olive green finish. Also Air-Flo Back Draft Dampers and Deluxe ball bearing shutters.

Write for catalogue and prices.

AIR CONDITIONING PRODUCTS CO.
1230—18th Street, Detroit, Michigan

Silent Air Home Kooler

A unit for every size of home, installed in attic, changes air in entire house sixty times an hour. Home Kooler with atmosphere provided by nature offers most economical method of relief from excessive heat during summer months.



Five sizes, shipped with rubber mounting in crate, which forms a suction box by merely covering with Celotex.

Your territory may be open for this popular line. Write today for interesting dealer proposition.

BELANGER FAN & BLOWER COMPANY
1238—18th Street, Detroit, Michigan

Designing by The New Code

(*Continued from page* 53)

Note in Table 4 that this *includes* a leakage of 10.8 cubic feet per hour for the crack between the wall and the frame.

For speed in multiplying we use 40 cubic feet in place of 39.3 cubic feet. Then in our living room we have 40 cubic feet of leakage per hour times 35 feet of cracks equals 1,400 cubic feet of air per hour leakage in the exposed wall of the living room. This is entered in the upper half of the living room rectangle in item 14.

In this plan there is no room with three sides exposed, so in each room we select the wall with the greatest footage of cracks and multiply this crackage in turn by the figure 40 as shown. As one more example, let us take the kitchen. One kitchen wall has a window 2 feet 6 inches wide by 3 feet high. The other wall has one window 3 feet wide and 3 feet high and an outside door. Because of the size and because steel sash are popular, we asume that these are steel sash and the average 2 foot 6 inch or 3 foot steel window has two vertically pivoted sash, so we will have two 3-foot cracks across and four 3-foot crack up and down. Then 3 feet times 2 equals 6 feet; 3 feet times 4 equals 12 feet; adding, we have 6 plus 12 equals 18 feet of crack.

Turning to Table 4 we find a factor for rolled section steel windows with $\frac{1}{32}$ inch crack of 52 cubic feet of leakage per hour per foot of crack. Our window will then pass 52 times 18 equals 936 cubic feet of air per hour.

The outside kitchen door measures 2 feet 6 inches wide by 6 feet 8 inches high. We have four cracks, so 2 feet 6 inches times 2 equals 5 feet, and 6 feet 8 inches times 2 equals 13 feet 4 inches. Our total door crackage is 5 feet plus 13 feet 4 inches equals 18 feet 4 inches or 18⅓ feet. For the door we use our 50 cubic feet of air per hour per foot and get 18⅓ times 50 equals 900 cubic feet. Then, adding our door and window, we get 900 plus 936 equals 1836 cubic feet per hour.

This data sheet was worked out from actual measurements of an actual steel window, which we do not have, hence the smaller window crackage shown .n the data sheet.

This procedure is used in each room in the house. When item 14 is completely filled in, the designer knows that he has carefully considered every factor connected with air leaking into his rooms; he has actually checked on the job the tightness of the windows and doors; he has considered the actual type of window; he has checked doors to see how tightly they fit and whether or not weatherstripped; and may even have checked to see if doors are protected by porches, recesses, storm doors, etc.

There is, therefore, at the present time no more accurate method for establishing how much heat is required to warm air leaking into a house than this method.

In the next article we will show how these factors established in items 1 to 15 are converted in another part of the data sheet to actual heat losses.

The Hidden Success of PACIFIC Floor Furnaces



Heavy, Rust-resisting leak-proof Heating Element.

★

At Left: PACIFIC Multi-Tubular Burner with Patented Safety Pilot.

Here is a floor furnace engineered and constructed to the most exacting detail, to give perfect performance and extra long life. Heavy, rust-resisting, leak-proof heating element, and the famous Multi-tubular burner with patented safety pilot, are just a few of the reasons why Pacific Floor Furnaces lead the quality field in performance and economical operation. Of course they are A. G. A. approved.



A Pacific for Every Heating Need

- Duct Unit Heaters
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The New Pacific Single or Dual Register Floor Furnace with Modern Grille.

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We will be glad to send you complete literature —write for it today!

PACIFIC GAS RADIATOR COMPANY

1740 W. WASHINGTON BLVD., LOS ANGELES, CALIFORNIA

MAKE $5 TO $10 EXTRA ON EVERY CLEANING OR REMODELLING JOB

Warm air users gladly buy this automatic Skuttle Humidifier

FOR $20.00 INSTALLED



It costs you only $9.00 F. O. B. DETROIT

That gives you for labor (1 hr.) and profit $10.00

Millions of dollars are being spent advertising air conditioning and making your prospects and customers realize the value of proper humidity.

Cash in on this big opportunity by offering full automatic, adjustable humidity for $20 installed—the price of the Skuttle Type DS. Humidifier.

To the lower price market you can sell the Skuttle Watertender for $10 installed and make $5 for half-an-hour's work. Easy installation instructions with each unit.

Advertising folders to help you sell supplied free. Send coupon below for catalog of Skuttle line—backed by the broadest experience in the industry.

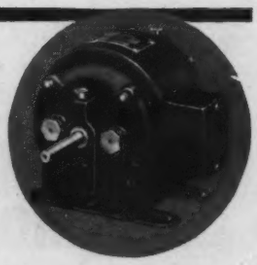
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Ohio Motors
Reliable Power for Air Conditioning Units



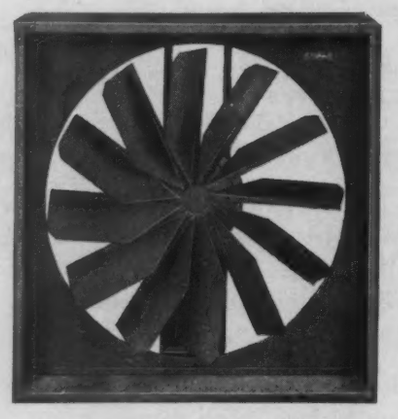
● You can depend on Ohio Motors being as accurately and carefully constructed as the finest air conditioning units of which they are part.

Machining to 1-10,000 of an inch, precise balance of rotating parts, perfect alignment—all are standard practice in the manufacture of *every* Ohio Motor. Each careful check and measurement contributes directly to Ohio Motors fine record of *reliability*.

Be sure the equipment you specify is Ohio Motor powered—then you can be sure that costly servicing will be at its lowest and customer satisfaction the highest.

THE
OHIO ELECTRIC MFG. CO.
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OHIO MOTORS



Allen Attic Fan
(Front or Outside View)

A Summer Volume Booster!

A life saver for your customers—a profit builder for you—is this easy to install Allen Attic Fan. NOW, with home owners complaining of hot nights, sell this installation which cools the whole house quickly. Low priced to buy—low cost to use.

Full details sent instantly on request.

The ALLEN CORPORATION
9752 ERWIN AVE., DETROIT, MICH.

Calculating Cooling Load

(*Continued from page 57*)

That is, it included the total area of openings on the sides of the house not exposed to the sun and the wooden sash and dividing strips on the sides exposed to the sun. At 2:00 p. m. this area was 243.7 sq. ft.

The front door was considered separately. Its area was 24.5 sq. ft. and a value for U of 0.52 was used, (Guide 1934, p. 92, Table 18).

Sample calculation for 2:00 p. m., June 27, 1934:

Windows, $H = 243.7 \times 1.13\ (97.1 - 79.9) = 4735$ B.t.u. per hr.
Door, $H = 24.5 \times 0.52\ (97.1 - 79.9) = 219$ B.t.u. per hr.

Total = 4954 B.t.u. per hr.

Heat Transmission Through Windows Exposed to Sun

The studies of F. C. Houghten* and others indicated that the total heat gain through a glass area shaded by an awning was 28 per cent of the total heat gain for the same glass area unshaded by an awning and exposed to the sun. Since the latter amounted to approximately 97 per cent of the sun's intensity normal to the window surface, it is sufficiently accurate for all practical purposes to regard the heat gain through a glass area shaded by an awning on the sunny side of a building as equal to 28 per cent of the sun's intensity normal to that area. At 2:00 p. m. on June 27 the sun's intensity as read from Fig. 38, for south and west windows was 63 and 144 B.t.u. per sq. ft. per hr., respectively. The heat transmitted by the windows shaded by awnings was therefore obtained by using 28 per cent of these values and multiplying by the respective glass areas for south and west windows.

The total radiation that would have been received by unshaded windows in the Research Residence for each hour of the day for days included in the months

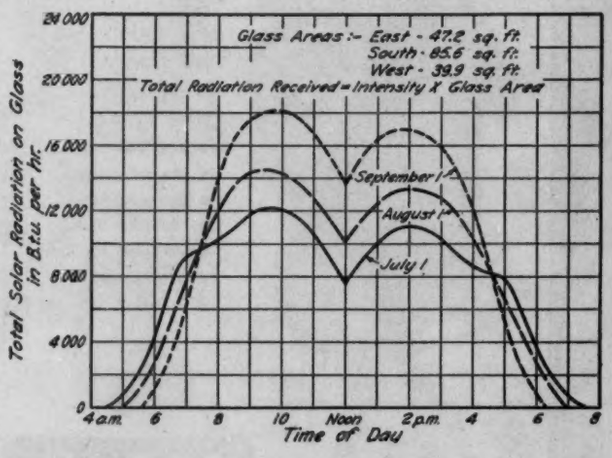


Fig. 39.—Total Radiation Received by Unshaded Windows.

*"Studies of Solar Radiation Through Bare and Shaded Windows," by F. C. Houghten, Carl Gutberlet, and J. L. Blackshaw. Trans. A.S.H.V.E. Vol. 40, 1934, pp. 101-118.

"Nu-way" Genii

LISTED AS STANDARD BY THE UNDERWRITERS LABORATORIES

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ECONOMY

There are many mistaken ideas about economy. Low price or cheap construction may be interesting to a buyer or dealer, but economy can only be measured from the day you install a burner until you or your customer has junked it.

Nu Way "Genii" Oil Burners are recognized as quality oil burners that will give many added years of trouble-free service.

A dealership with Nu Way is a dealership that will endure.

NU WAY CORPORATION
ROCK ISLAND ILLINOIS



Precision Standards Applied to Quantity Production



For furnace manufacturers who buy wheels only, Clarage offers any size desired, and can meet any quantity requirement. Clarage Wheels can be furnished standard width, or any percentage of standard width to deliver a specified volume of air at any operating speed. All wheels are PERFECTLY BALANCED for quiet operation without vibration.

Clarage Furnace Fans (complete assemblies) combine many advantages. They are positive centrifugal type, very compact, highly efficient, and the low speeds insure SILENT OPERATION.

Write for complete information and price schedules.

SPECIFY CLARAGE for COMPLETE AIR CONDITIONING · VENTILATION · HEATING · COOLING · MECHANICAL DRAFT · FANS & BLOWERS FOR INDUSTRIAL NEEDS

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

UNI-FLO



GRILLES and REGISTERS

DESIGNED FOR AIR CONDITIONING

Engineered Air Distribution Outlets

- UNI-FLO Grilles and Registers permit the use of higher air velocities than ordinary outlets.
- They also allow the use of greater air temperature differentials. These two factors reduce the size and number of ducts and outlets.
- The air stream is highly diffused, due to the exclusive UNI-FLO fin design.
- Directional fin arrangements can be **pre-planned** for correct air distribution.

Send for Data

BARBER-COLMAN COMPANY • ROCKFORD, ILL.

PULLEYS

DESIGNED FOR AIR CONDITIONING



For "A" and "B" Belts

A complete stock of all sizes for "A" and "B" belts from 1½" O. D. to 14" O. D. which lists from 42c and up.

Ideal where quiet operation and true running at all speeds is essential.

Let us show you how we are saving hundreds of manufacturers thousands of dollars annually.



Variable Pulley

Ideal for air-conditioning units where a speed variation up to 30 per cent is desired. Four sizes are available—3¼", 3½", 4", and 4½"—list price $3.00 to $3.75. Save up to 50 per cent on this pulley.

CONGRESS TOOL & DIE COMPANY
9034 Lumpkin Avenue
DETROIT, MICHIGAN, U. S. A.

NEW IMPROVED MILES JUNIOR Air Conditioner



POSITIVELY QUIET OPERATION
★
FOUR FILTERS EXTRA CLEANING CAPACITY
★
3-SPEED HEAVY-DUTY MOTOR

ATTACHES to any gravity furnace. Provides circulating, filtered air. Extra comfort for the home owner. Extra profit for you. Write for circular.

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THE PUBLIC DEMANDS QUALITY!
CHALMERS HAS IT



17 YEARS of active experience! Used widely in America, Europe, Asia and Africa. Carries Underwriters and New York City approval. Used by the U. S. Government. Adapted to Boiler-Burner and Furnace Units. New literature available for interested dealers — Write today.



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USE YOUR LETTERHEAD, IT STIMULATES US!

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of July, August, and September, is shown by the curves in Fig. 39. At any given hour the amount of heat actually transmitted by the windows, which were all shaded by awnings, would be 28 per cent of the value read from these curves.

Sample calculation for 2:00 p. m., June 27, 1934:

South windows, $H_s = 85.6 \times 63 \times 0.28 = 1510$ B.t.u. per hr.
West windows, $H_s = 39.9 \times 144 \times 0.28 = 1610$ B.t.u. per hr.

Total = 3120 B.t.u. per hr.

Heat Transmission Through Ceilings

The heat transmission through ceilings was calculated from Equation (1), Section 2. The temperature in the attic space at any given time was obtained from test data. The attic space contained a floored section having an area of 395 sq. ft., for which a coefficient of 0.24 was used, (Guide 1934, p. 87, Table 10); an unfloored section having an area of 304 sq. ft., for which a coefficient of 0.62 was used, (Guide 1934, p. 87, Table 10); and a section of 182 sq. ft., which had ¾ in. of blanket insulation nailed to the top of the joists. The calculated value of the coefficient for the latter as 0.19.

Sample calculation for 2:00 p. m., June 27, 1934:

Floored ceiling,
$H = 394 \times 0.24\ (104.7 - 79.9) = 2352$ B.t.u. per hr.

Unfloored ceiling,
$H = 304 \times 0.62\ (104.7 - 79.9) = 4675$ B.t.u. per hr.

Insulated ceiling,
$H = 182 \times 0.19\ (104.7 - 79.9) = 858$ B.t.u. per hr.

Total = 7885 B.t.u. per hr.

Heat Transmission Through Floor

The heat transmission from the first story to the basement through the floor was calculated from Equation (1), Section 2. The total area of the floor was 850 sq. ft., and the coefficient used was 0.34, (Guide 1934, p. 87, Table 13, Floor No. 1D). Since the temperature in the basement was less than that on the first story the heat flow was from the first story to the basement. Hence the heat gain in this case was negative.

Sample calculation for 2:00 p. m., June 27, 1934:

$H = 850 \times 0.34\ (77.3 - 79.4) = -607$ B.t.u. per hr.

Heat Brought in by Infiltration or Ventilation Air

Since approximately one air change per hour of air for ventilation was delivered into the house, it was considered that the amount resulting from infiltration was negligible. The heat gain was therefore calculated from the weight of air delivered and the difference in enthalpies for indoor and outdoor air. These enthalpies were determined by the respective wet-bulb temperatures from Table 2, pp. 6-9, Guide 1934. For a wet-bulb temperature of 76.5 deg. F. outdoors the enthalpy was 39.20 B.t.u. per lb., and for a wet-bulb temperature of 65.2 deg. F. indoors it was 29.80 B.t.u. per lb. The weight of air delivered by the ventilating

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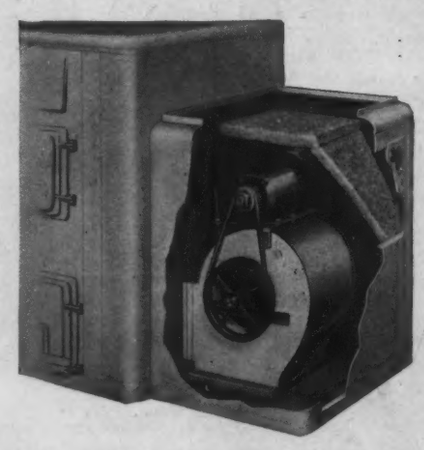
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Order one TODAY from your jobber — or write

FURBLO COMPANY, Hermansville, Mich.

fan, as determined by Pitot tube readings was 1015 lb. per hr.

Sample calculation for 2:00 p. m., June 27, 1934:

$$H = 1015\ (39.20 - 29.80) = 9540 \text{ B.t.u. per hr.}$$

Heat Given Off by Occupants

The work of F. C. Houghten* and others indicates that the heat loss from a sedentary individual is approximately 400 B.t.u. per hr. The average occupancy at the Research Residence was equivalent to approximately 4 people. Hence the heat given off by occupants was $4 \times 400 = 1600$ B.t.u. per hr.

Heat Given Off by Electric Lights

At 2:00 p. m. on June 27, 1934, no lights were in use.

Heat Given Off by Electric Motors

It was considered that approximately 80 per cent of the heat equivalent of the electrical input to the fan motor was absorbed by the air delivered through the system. This electrical input was 340 watts. Hence the heat given off by the motor was,

$$340 \times 0.80 \times 3.415 = 929 \text{ B.t.u. per hr.}$$

Summary

The summation of all of the heat gains given in items (1) to (10) inclusive, taking into account the negative value for item (6), gave a total of 36 846 B.t.u. per hour for the calculated cooling load at 2:00 p. m., June 27, 1934.

*"*Heat and Moisture Losses from Men at Work and Application to Air Conditioning Problems," by F. C. Houghten, W. W. Teague, W. E. Miller, and W. P. Yant. Trans. A.S.H.V.E. Vol. 37, 1931, p. 544.*

Air Conditioning Airplanes

(*Continued from page 60*)

warm-up and conditioning of the air in the passenger cabins prior to take-off as the plane's system does not begin to function until the plane takes to the air. These conditioners, equipped during winter with heating units and during the summer with refrigerating units, are used to bring the cabin temperature to 70°, regardless of outside conditions, before passengers are boarded.

The engines of these new ships, capable of a maximum output of 1150 horsepower, will cruise the twelve ton transports at only 62½% power and still make the fastest speeds desired. With a full load, the two engines will climb the plane to 24,300 feet and with only one engine in operation, level flight can be maintained at 10,500 feet. The twelve ton transports can take off, fully loaded, with a run of only 980 feet. A fuel capacity of 820 gallons permits operation from California to New York with only two refueling stops and nonstop from Chicago to New York with sufficient extra fuel to turn around and almost fly back to Chicago.



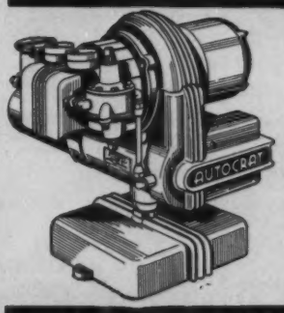
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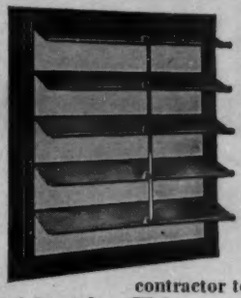
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Fans, 12" to 60" Single and Multiple Blade.
PRICE ON REQUEST Also all sizes automatic shutters.

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CHANDLER COMPANY
CEDAR RAPIDS, IOWA

Cooling by Ventilation

(*Continued from page* 59)

Psychology is such a large factor and ideas are so diversified among the office help, that the only way the installer can protect himself is to give workers a system by which they can get anything they want at any time, then leave the operation to them. Of course he should inform them how to operate it to get maximum results.

Fan Operation

In summer the general office and the private offices will want to have their fans operating all night long and closed off all day long. The toilet fans will want to be operated all night and at least intermittently during the day. In winter the toilet fans will want to be operated all day long, but the fans in the general office will only be operated when the necessity arises, more likely because of a need for cooling rather than ventilation requirements.

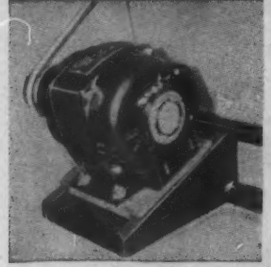
The private offices can be operated to suit the requirements from hour to hour. In extremely cold weather it will be possible to ventilate the general office with reasonably satisfactory results by running the fan over the private offices and the one over the toilets, without using the two 36-inch fans. This will be more effective if the doors from the general room into the private offices are left open. With all outside windows closed, at least one half of the air will come into the toilet rooms and into the private offices from the general office room. Grilles in the bottom of the partition doors will help heat distribution. Seepage intake will be adequate because glass areas are large and the winter ventilation need is not acute.

Volume of Exhaust

On the basis of 50% of the toilet room fan capacity and 50% of the private office fan capacity being available for winter ventilation of the general office, we have an exhaust of 3,825 cfm for the general office without excessive heat loss. On the basis of 30 cubic feet per minute per person, this will take care of 127 people, which is somewhat more than the general office is likely to contain at any time. This refers to winter ventilation.

For the summer ventilation we have a total capacity of 24,500 cfm. On the basis of one Btu for every 55 cubic feet of air we have 446 Btu of heat absorption per minute for each degree of temperature differential. Conservatively estimating that the exhausted air during the night will average 5 degrees warmer than the cool air being brought in, we have 2,230 Btu per minute or 1,338,000 Btu during the 10 cooling hours of the night. This is the equivalent of the melting of over 9,000 pounds of ice. It will take 17 kilowatt hours of electric current to operate these fans for 10 hours. On a 3-cent rate it will cost 51 cents to give the cooling equivalent of 4½ tons of ice.

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You will never be called back to adjust the belt on a 3-speed VIKING Blower or VIK-AIR Conditioner. It is taken care of automatically. The motor rides on a block that slides on rails. Spring tension plus part of the motor weight, keeps the belt at the right tension always. Slipping, slapping, and manual adjustment are eliminated forever by this simple, fool-proof arrangement.

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Made for both "A" and "B" belts in all practical sizes, with heavy rolled edges and solid steel or malleable iron hubs. No DIE CAST HUBS are used in MAUREY Pulleys.



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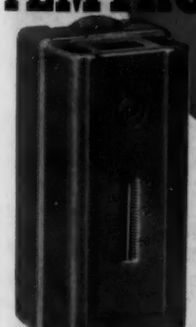
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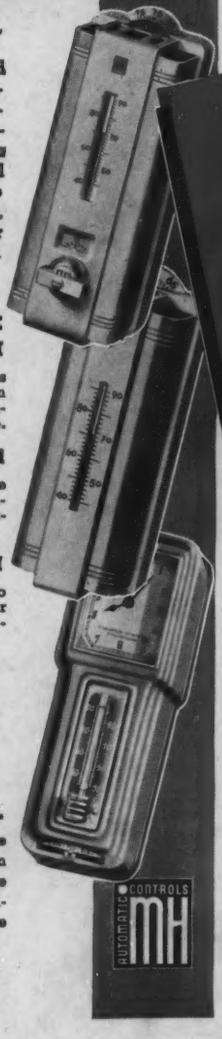
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The Fort Wayne Licensing Ordinance

Fort Wayne, Ind., now takes its place with other cities operating under a warm air heating ordinance which sets up provisions for satisfactory design and installation of heating systems and provides for enforcement with fees, license and inspection. Part 1 of the ordinance was published in June; part 2 in July. Anyone wishing complete information should write us.

Minimum Requirements for Estimating Heat Required

Section 13. The method which shall be used in computing the minimum amount of heat in British thermal units (B.T.U.) per hour which must be supplied to or generated within any building to maintain the inside temperature hereinafter stipulated, with the outside temperature and wind movement assumed as in this ordinance provided, shall be as hereinafter set forth in this ordinance, and shall apply to all types of heating systems. The inside temperature shall be measured at the breathing line, which shall be on a plane two feet six inches (2' 6") above the floor level and not less than (3) feet from any outer exposed wall. The procedure which shall be followed in using the data in Sections 13 to 16 of this ordinance for estimating the heat required for warming buildings shall be as follows:

(A) Select from Table No. 1 the inside air temperatures, at the breathing line, which are to be maintained in the building during the coldest weather.

(B) The outside air temperature which shall be used for design purposes shall be taken as Fahrenheit zero.

(C) Select from the following tables or secure from the Inspector the heat transmission coefficients for outside wall and glass, also for any floor, wall or ceiling next to unheated space and any portion of roof next to heated space.

(D) Measure up net outside wall, glass and roof next to heated spaces as well as any cold floor, wall or ceiling next to unheated space. Such measurements shall be made from the building plans submitted to the Inspector by the heating contractor. Should it subsequently develop that said plans so submitted are inaccurate in any essential detail, it shall be the duty of the heating contractor, upon being notified so to do by the Inspector, to make such changes in the heating intallation as may be necessary to correct any resulting discrepancy therein and to bring same into conformity with the requirements of this ordinance.

(E) Compute the heat transmission losses for each kind of wall, glass, floor, ceiling and roof in the building by multiplying the heat transmission coefficient in each case by the area of the surface in square feet and then by the temperature difference between the inside and outside air. (See items A and B) (See also table in Section 15 for Heat Transmission Coefficients.)

(F) Select unit values and compute the heat equivalent of the infiltration of cold air taking place around outside doors and windows. Said unit values shall be taken to depend on kind and width of crack as assumed in Section 16 of this ordinance, with wind velocity assumed at fifteen (15) miles per hour, and when multiplied by the length of crack, and then by the temperature different between the inside and outside air, the result shall be taken to be the heat required to warm the cold air leaking into the building per hour.

(G) The sum of the heat losses by transmission (Item E) through the outside wall and glass, as well as through any cold floors, ceilings or roof, and the heat equivalent (Item F) of the cold air entering by filtration or introduced mechanically shall be taken as the total heat required for maintaining the required inside temperature in the building.

Section 14. Inside Air Temperatures: The minimum inside air temperature which shall, for the purposes of this ordinance, be assumed as that to be maintained within a building shall be as given in the following table:

Table No. 1

Assumed Inside Air Temperatures

Type of Occupancy—Degrees Fahrenheit

Dwellings as defined by the State Housing Act, Offices, Retail Stores, Schools, places of Assembly, Theaters, Dance Halls, Restaurants or buildings of similar occupancy and all employment areas of more or less sedentary occupations	70

Industrial Spaces

Employment Areas:	
Light Labor	65
Heavy Labor	55
Storage Areas	None

Garages

Storage	40
Employment Areas	60

Provided, however, that in industrial and storage spaces where the manufacture, processing or storage of materials or products requires a temperature lower than those above specified, special permission may be granted by the Inspector to use such lower temperature for design purposes, as conditions may warrant.

Section 15. Coefficients of Heat Transmission for Various Types of Wall, Floor, Ceiling and Roof Construction: For the purposes of this ordinance, in estimating the heat required for warming buildings, the coefficients of heat transmission to be employed, for various types of wall, floor, ceiling and roof construction, and for doors, windows and skylights, shall be as set forth in Chapter 5, Volume 13, American Society of Heating and Ventilating Engineers Guide, 1935 edition, or as hereinafter provided for in this section.

Coefficients of heat transmission to be used, under the provisions of this ordinance for any types of wall, roof, ceiling or floor construction not set forth in the preceding tables shall in each case be determined by the Inspector.

Section 16. Infiltration: For the purpose of this ordinance, in estimating the heat required for warming buildings, the infiltration in cubic feet per hour per lineal foot of crack, and the B.T.U.'s per hour per lineal foot of crack required, for various types of windows and doors, shall be as set forth in Chapter 6, Volume 13, American Society of Heating and Ventilating Engineers Guide, 1935 edition.

Minimum Required Chimney Flue Areas for Warm Air Furnaces, and Requirements for Smoke Pipes

Section 17. Owner's Duty to Provide Proper Chimney: It shall be the duty of the owner of any building in which it is hereafter proposed to install any warm air furnace for use in connection with a heating system in such building,

to provide a properly constructed chimney to which to connect such furnace, which chimney shall be or be made smoke tight throughout and shall contain a flue not less in area and height than as hereinafter provided for in Section 18 of this ordinance.

Section 18-a. Required Area and Heights for Chimney Flues: Except as hereinafter provided, each warm air furnace hereafter installed for use in connection with a heating plant shall be connected to a chimney flue the area and height of which shall not be less than those specified in the following Table No. 2 for boilers or furnaces of like capacity:

Table No. 2

Chimney Flue Sizes

War Air Furnace Capacity in Sq. In. of Leader Pipe	Steam Boiler Capacity Sq. Ft. of Radiation	Hot Water Heater Capacity Sq. Ft. of Radiation	Nominal Dimensions of Fire Clay Lining in Inches	Actual Inside Dimensions of Fire Clay Lining in Inches	Actual Area Sq. In.	Inside Diameter of Lining in Inches	Actual Area Sq. In.	Height in Ft. Above Grate
790	590	973	8½x13	7 x11½	81			35
1,000	690	1,140				10	79	
	900	1,490	12 x13	11¼x11¼	127			
	1,100	1,820				12	113	40
	1,700	2,800	13 x18	11¼x16¼	183			
	1,940	3,200				15	177	
	2,130	3,520	18 x18	15¾x15¾	248			
	2,480	4,090	20 x20	17¼x17¼	298			45
	3,150	5,200				18	254	50
	4,300	7,100				20	314	
	4,600	7,590	20 x24	17 x21	357			
	5,000	8,250	24 x24	21 x21	441			55
	5,570	9,190		24 x24*	576			60
	5,580	9,200				22	380	
	6,980	11,500				24	452	65
	7,270	12,000		24 x28*	672			
	8,700	14,400		28 x28*	784			
	9,380	15,500				27	573	
	10,150	16,750		30 x30*	900			
	10,470	17,250		28 x32*	896			

*Dimensions are for unlined rectangular flues.

Required chimney flue sizes for furnaces with capacities larger than those specified in Table No. 2 and for installations where more than one furnace is to be connected to the same flue shall be determined by the Inspector in accordance with the best engineering practice.

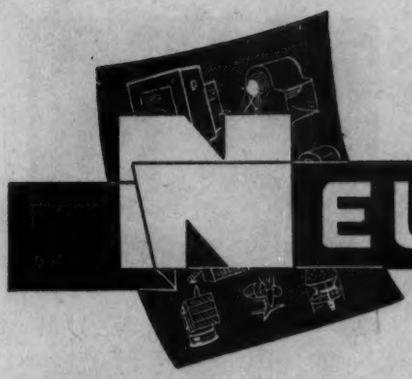
Provided, however, that in any building which, together with its chimney, were both constructed prior to the passage of this ordinance, a warm air furnace whose leader pipe area capacity does not exceed one thousand (1,000) square inches may be installed and connected to said chimney if the area of the flue of said chimney be not less than sixty-three (63) square inches; a warm air furnace whose leader pipe area capacity does not exceed 500 square inches may be connected to a chimney if the area of the flue of said chimney be not less than fifty (50) square inches; a proportionately greater area of chimney flue shall be required when the capacity of the furnace to be connected thereto is greater than above specified, all subject to the approval of the Inspector and said Inspector is hereby authorized and empowered to require such increase in the height of any such chimney flue, or such other changes, as he may deem necessary to help compensate for lack of flue area and insure safety. Such chimney flue of reduced area shall have no other vent or smoke pipe connected thereto.

Section 18-b. Fuel Restriction with Chimney Flues of Reduced Areas: It shall hereafter be unlawful for any person, firm or corporation to burn, in any warm air furnace attached to a chimney flue of reduced area such as hereinbefore provided for in this section of this ordinance, any solid fuels having more than twenty-one (21) per cent volatile matter content, and any violator of this provision of this ordinance shall be subject to the penalties, hereinafter provided.

Section 19. Smoke Tests Required. When: All flues to which heating furnaces are to be connected hereafter shall be subjected to and must successfully withstand a smoke test before such connection is permitted, which test shall, in the case of new chimneys, he made after the mortar has set. Such smoke test shall be made by building a smudge fire at the bottom of the flue, using tar paper or similar material to create the smudge, and when the smoke is flowing freely from the top of the flue, closing it tightly at the top, all heater or vent openings into said flue to be tightly closed before test is started and the clean-out opening to be left open for draft. All leaks in any such flue disclosed by such test to be closed and made tight before the chimney is accepted or a heating plant connected thereto. It shall be the duty of the owner to make such test or to have the same made, at his expense, and such test shall be made in the presence of the Inspector of heating and sheet metal work and of said owner or his representative. Not more than one flue in the same chimney shall be tested at one time. All chimneys in buildings that have been moved to new locations shall be tested in the above manner before being put into use. The Inspector may order and require that existing chimneys be similarly tested, and repaired or rebuilt as may be necessary to make them tight and safe.

Section 20. Smoke Pipes, Required Weight of Metal for: For each and every steam or hot water boiler or warm air furnace hereafter installed under the provisions of this ordinance, the area of the breeching or smoke pipe shall not be less than the area of the smoke collar of the boiler or furnace to which it is connected, and each such breeching or smoke pipe shall be made of material equal in durability to galvanized iron of thicknesses (U. S. Standard Guage), for the various areas of such breeching or smoke pipes, not less than the following:

(*Continued on page* 94)



For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 108 and mail to us. Complete information will be forwarded.

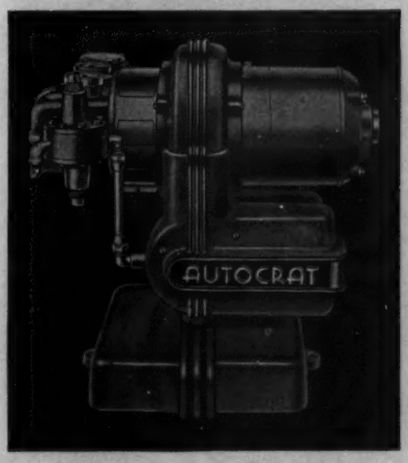
● Indicates product not listed in 1936 Directory

△ Indicates product and manufacturer not listed in 1937 Directory

NEW PRODUCTS

109—New DeLuxe Model

Autocrat Oil Burner Corporation, 100 E Avenue, N. W., Cedar Rapids, Iowa, has just been granted a patent on a new modernistic oil burner design—the DeLuxe Model DA-1.



The new model DA-1 embodies such features as concealment of transformer and ignition wires, modernistic square base with beading extending over cover plate, blower housing, and pump cover. The design was created by Arthur Charles Haggstrom, industrial designer, who collaborated with the company's engineering department.

◆

110—Portable Air Conditioner

Star Radiator Company, 649 Ceres Avenue, Los Angeles, Calif., is distributing a 4-page folder on the Sta-Cool air conditioning system. The Sta-Cool cabinet for air cooling is usually installed outside a window, in an attic, furnace room or porch. It is a portable installation, using water as the cooling medium.

With water at temperatures as high as 75 deg. available, Sta-Cool is said to provide cooling comfort. There is a washable-type filter, an automotive-type radiator, a ¼-hp. motor, twin blower of centrifugal or squirrel-cage type, twin fans, grille extension for outside installations, motor pump and a cooling tower designed for 20 pounds wind pressure and to meet building code specifications. Ten gallons of water is required for each cabinet and each tower is equipped with a simple water supply treatment.

111—Dux-Sulation

Grant Wilson, Incorporated, producers of insulation and fireproof materials, 4101 West Taylor Street, Chicago, Illinois, announces a new duct insulating material, Dux-Sulation.

Dux-Sulation is a fibre felt product which seems to meet the complete requirements of the air conditioning field from an insulating standpoint. It readily adapts itself to application on round, square or irregular ducts.

◆

112—Cleans Air Electrically

Westinghouse, East Pittsburgh, Pennsylvania, announces a new electrostatic precipitator. This cleaner is said to remove particles as small as one-fifth micron in size. The unit is so perfect in operation that it removes smoke from the air as shown in the demonstration by Dr. Phillips Thomas, Westinghouse Research Engineer.



Operating on an electrostatic principle, the device charges the particles in the air which then cling to magnetic plates in the filter.

Principal fields of application are:

1. Removal of industrial dusts which constitute a hazard to health of employees.
2. Air cleaning to protect delicate apparatus or processes.
3. Air cleaning in homes and offices in soft-coal burning cities to reduce cleaning of walls and draperies.
4. Air cleaning for the relief of hay fever and asthma.
5. Air cleaning in stores to reduce damage to merchandise.

△113—Lacquers Resist Heat

Maas & Waldstein Company, Graybar Building, New York, N. Y., has developed a new line of clear and pigmented air-drying lacquers, specially designed for finishing electrical equipment and other products normally subjected to elevated temperatures.

These new finishes, which are known as Durheat lacquers, are said to retain their flexibility, color, and adhesion indefinitely at temperatures up to 300 deg. F. They are finding application for direct and indirect lighting fixtures, lamp enclosures, radiant heaters, electric signs subjected to heat, electric ranges, ovens, and similar equipment.

Durheat lacquers are supplied in clear, black, white, and all colors, and can be applied by either dipping or spraying.

◆

114—New Attic Package

Viking Air Conditioning Corp., Main & Center St., N. W., Cleveland, announces the new CirCOOLator, available in 30, 39 and 45 in. sizes, in capacities of 7,000, 10,000 and 14,000 cfm, respectively.

Comfort Bulletin No. 44 shows the CirCOOLator made into an attractive cabinet unit. The attic model is a complete package unit requiring no complicated engineering or installation problems. An automatic switch starts the fan when the trap door is opened



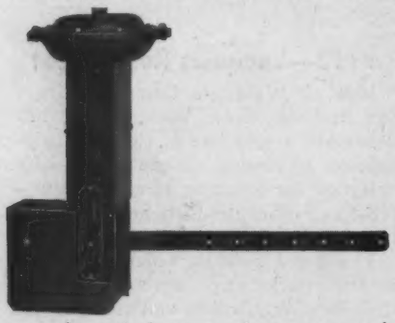
and shuts it off when the door is closed. Inside the cabinet is the Helixoid fan which runs at very low speed and is completely floated on rubber cushions. The inclined self-adjusting motor base acts as an automatic belt tightener.

New Products . . . . . .

●115—New Lever Motor

Taylor Instrument Companies, Rochester, New York, announces the Motosteel Evenaction lever motor.

Design and operating features recommend this new lever motor for the



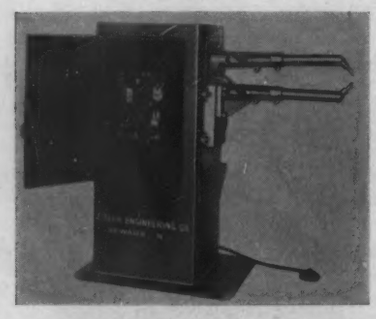
operation of dampers, lever operated valves, butterfly valves, electrical rheostat for variable speed motors, for the control of electrical equipment, or for the operation of any device by the conversion of pneumatic energy to linear or angular mechanical motion.

◆

△116—Air-Operated Spot Welder

Eisler Engineering Co., Inc., Newark, New Jersey, has added a new resistance welder to its line.

Welds on this new air-operated spot welder are controlled by means of a solenoid starter. By depressing the starter, the solenoid actuates the air cylinder which in turn closes the electrodes upon the work. The duration of the welding period is regulated by the automatic timer and contactor, as-



sembled on the side of the fabricated frame. The timer is adjustable to regulate current from 2 to 60 cycles in 110 divisions. An air pressure valve on the machine is used to regulate the proper air pressure; this welder operates on an air pressure of 35 to 60 lbs. depending on the nature of the work.

Variation in type of work is facilitated by the interchangeable arms available on this welder. A water cooling arrangement passes water through the arms, electrode holders, and electrodes—water is circulated very close to the end of the electrodes.

This welder is said to be capable of making up to 100 spots per minute.

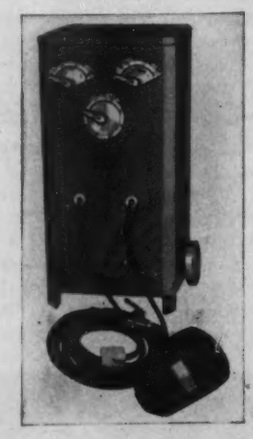
△117—Hoist for Conditioners

Myers Engineering Equipment Co., 3947 West Pine Blvd., St. Louis, Mo., announces the new A-C "Jack It Up" hoist suitable for installing conditioners, fans, motors, unit heaters, heating coils, shafting, pulleys, etc. Conditioners six feet in width and weighing up to 4,000 lbs. in rooms having fourteen foot ceilings can be handled, they say.

◆

118—Dual Control Welder

Miller Electric Manufacturing Co., Appleton, Wisconsin, has just placed on the market an A. C. Welder with separate voltage and amperage controls, enabling the operator to select



the most desirable voltage for the amperage used on any job. This welder, known as "Dual Control," is easy to operate; the three dials on the front of the cabinet are plainly marked, and it is compactly built but heavily constructed for hard usage. Built in 3 sizes with a current range from 10 amperes to maximum output that makes possible welding of sheet metal or heavy metal, this welder is equipped with wheels and a handle so that it is as portable as a truck.

◆

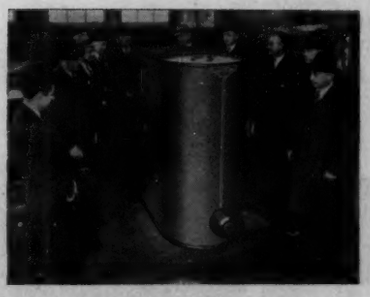
119—Oil-Burning Heater

The Cleveland Steel Products Corporation, Toridheet Division, Cleveland, Ohio, manufacturers of Toridheet oil burners and air conditioning equipment, announces a new oil-burning water heater.

The unit is fully automatic, has a wide range of water temperature adjustments and may be equipped with interchangeable burners for fuel oil, kerosene or gas.

It is available in a standard round style or square cabinet model in plum-finished sheet steel and can be furnished in 20, 30 or 40-gallon capacities.

Average fuel consumption for a family of four persons is approximately ¾-gallon per day. Cost of operation averages five cents a day.



120—Low Priced A. C. Unit

Gar Wood Industries, Inc., Detroit, will soon announce a new low-priced automatic heating and air conditioning system, according to Mr. Frank H. Dewey, general manager of the air conditioning division. The new unit Model E. W. was created for low-priced homes in the $5,000 to $7,000 bracket.

The new E. W. unit includes the air ducts which deliver air to and from the rooms, and will provide automatic heating and air filtering, humidifying and forced warm air circulation in the winter and air filtering and blower cooling in the summer.

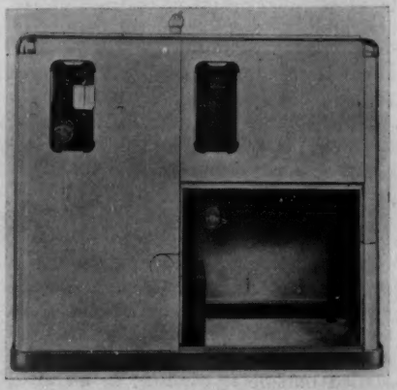
◆

121—New Oil Eighty Jackets

Fitzgibbons Boiler Company, Inc., 101 Park Avenue, New York City, announces two new models of streamline jackets for the Oil Eighty automatic steel boiler for oil burning.

The manufacturer states that "a thousand service men with their comments and suggestions helped to develop the convenience features of this new jacket enclosure."

The jacket "streamline styled" is in



striking green finish and chromium trim, heavily insulated.

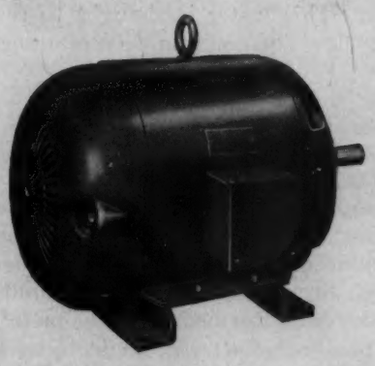
Fitzgibbons also announces a new type jacket to be known as the standard jacket, where the installation is of such a nature that the oil burner is either of the rotary type or, if preferable, the burner may be installed outside and in front of the jacket. It is smaller, more compact, and priced slightly under the de luxe jacket.

The Fitzgibbons boiler is built in 12 different sizes, from 425 to 2680 sq. ft. of steam EDR. All models from the OE-6 up may be equipped with instantaneous tankless hot water service coils—trade-named the "tanksaver."

New Products . . . . . .

122—Improved Motor

Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, Missouri, announces a recently improved Type CP—totally-enclosed fan-cooled motor.



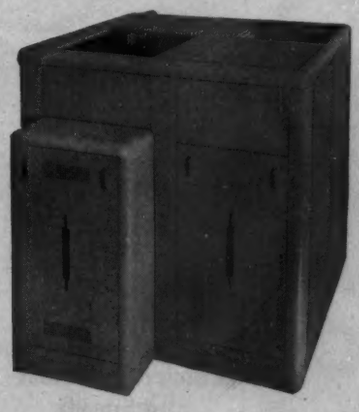
The type CP motor meets the long standing demand for a totally-enclosed sealed unit for driving equipment which must be operated in atmospheres heavily laden with abrasive dusts, deteriorating metals and salts, explosive dusts, corrosive gases and extreme dampness on out-of-door applications.

◆

123—New Peerless Furnace

Peerless Foundry Company, 1855 Ludlow avenue, Indianapolis, Ind., is offering a new, compact, stream-lined furnace, which they say is equally efficient for oil burning, stoker, gas or hand-firing.

Modern lines of the Peerless furnace enclose the economical Peerless heating



unit, and the Peerless Cleanaire blower which forces filtered warm air through registers in winter and provides comfortable "night-cooling" in summer.

An exclusive radiator construction design—horizontal fire tubes—utilizes all the heat generated and allows construction of a compact, easily accessible unit, saving basement space and assuring easy installation and operation.

The Peerless furnace is finished in an attractive baked green enamel.

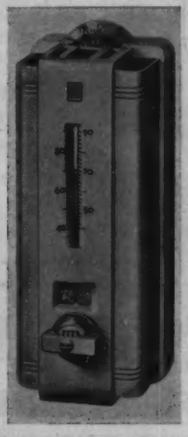
124—Explosion Proof Cases

The Mercoid Corporation, 4213 Belmont Avenue, Chicago, Illinois, has developed explosion proof automatic controls. Explosion proof cases for several types of controls are available, being shipped as complete assembled units ready for installation in danger zones.

◆

125—Da-Nite Acratherm

Minneapolis - Honeywell Regulator Co., Minneapolis, Minnesota, announces the Da-Nite Acratherm combining the Acratherm and the Time-O-Stat into one small, attractive thermostat and offering in one instrument, manually lowered temperature, night or day, with its resultant fuel economy . . . automatic return to the desired temperature level whenever wanted . . .



and the accuracy of control provided by Minneapolis-Honeywell "Heat Acceleration." The Da-Nite Acratherm is equipped with a black setting wheel and winding knob—both on the same shaft.

55 to 85 deg. F. is the day scale range of the Da-Nite Acratherm and 45 to 75 deg. F. is the night scale.

◆

•126—Corner Lock Machine

Ward Machinery Company, 564 West Washington Boulevard, Chicago, is exclusive distributor of the new Almer corner lock forming machine.

The Almer will handle up to 22-ga. and lighter and is said to produce a Pittsburgh or Hammer Lock edge in one operation at the rate of 32 feet per minute. It makes a lock ¼-inch wide, which will account for ¾-inch plus ¼-inch hammer edge, or a total consumption of one inch material. Every lock is open. Ducts may be formed in the shop and sent to the job nested. On the job they may be trimmed in length and all locks hammered or malleted over.

One man operates the machine and the makers claim on an actual test with a stop watch, 102 eight-foot lengths of 24-ga. were run through and Pittsburgh locks formed on the edge of every sheet in 46 minutes.

◆



127—New Stoker Hoppers

Butler Manufacturing Company, Thirteenth & Eastern Avenue, Kansas City, Missouri, announces new model hoppers for their Automatic Butler coal stoker—the streamlined DeLuxe hopper with chromium trim and hammerloid finish for basement recreation rooms, and the new low Standard hopper which holds sufficient fuel supply, yet is low enough for easy filling.

These hoppers come in blue, light green, bronze, red and black. The DeLuxe hoppers are chromium trimmed.

◆

128—New Fractional H. P. Motors

The Century Electric Company, St. Louis, Missouri, announces a new complete line of fractional horse power motors in sizes from ⅙ to ¾ horse power, repulsion start induction, single phase, split phase, capacitor, polyphase and direct current.

This line is designed with inter-



changeable mounting dimensions for a given horse power size.

The fundamental principles are the same as have been used by Century for many years, but many improvements have been added.

Finishing Stainless Steel Welds

(*Continued from page* 21)

a stroking motion and lift the tool before reversing the stroke. Keep the strokes uniform and do not dwell in one spot. This is important; for it will help prevent overheating the work, and temperatures above 150 deg. F. might cause wrinkling, buckling, and discoloration. An oscillating motion does much to break up the polishing lines; so change the direction of the polishing tool to prevent the abrasive cutting deeper into the same groove.

The skillful operator can help prevent the overheating of small objects during polishing by allowing them to roll slowly in his heavily mittened hand.

If the weld requires annealing, or if pickling is necessary, these operations can be carried out without destroying the polished finish imparted to the weld. Surfaces finished with rouge or emery should be pickled by immersion for 15 to 20 min. in a warm nitric acid solution whose specific gravity is approximately 1.15, corresponding to 25 per cent HNO_3. The steel should then be thoroughly washed with hot water, and dried.

Buffing Welds in Stainless Steel

Buffing, in general, is the practice of producing a smooth uniform surface by means of a revolving buff in contact with the work. As contrasted to polishing, the abrasive is not glued on the wheel, but applied to the revolving buff from a bar or paste composed of an abrasive and a binder. Buffing can be divided into two operations, "cutting-down" and "coloring." Cutting-down is the buffing operation performed with a sharp compound to bring a rough surface to a smoother surface as a step preliminary to "coloring." Coloring is the final buffing operation by which a high finish or luster is imparted to the work. This luster is thought to result largely from a "flow" of metal molecules along the surface.

Lower Finishing Costs

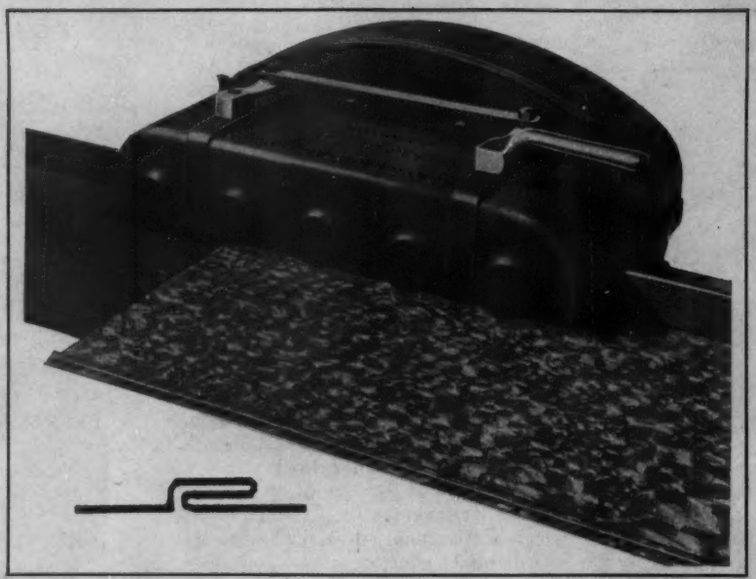
The salability of a stainless steel article depends to a great extent and sometimes entirely upon the type of finish and the economy with which this finish has been produced. In the production of an article having a high luster it is necessary to eliminate all of the defects from the surface of the metal, whereas a soft or brushed effect will blend in with die marks or scratches in the metal; and this fact alone many times eliminates one or more finishing operations, and thus lowers the production cost of that particular article. To lower manufacturing costs, fabricators usually have more chance of success by investigating the finishing operations of their welded products than by seeking to improve their machining and forming operations.

There has been a decided reduction in the cost of buffing stainless steel in contrast to the first efforts

SAVES TIME--MAKES MONEY

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Indispensable to Every Progressive Sheet Metal Ventilating and Air Conditioning Shop



Automatically Produces Open Pittsburgh or Hammer Locks at Rate of 25 Feet Per Minute on Material 22 Ga. and Lighter. Efficient — Neat and Speedy

Write for Details

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WARD MACHINERY COMPANY

564 W. WASHINGTON BOUL.

CHICAGO - ILLINOIS

in polishing and buffing this metal. This reduction has resulted from improvements in buffing compounds, and especially from more time and effort spent in the previous polishing.

Buffing Materials

Buffs are flexible wheels made of paper, cloth and sheepskin disks. Formerly sheeting no finer than 48-48 count was in common use for the manufacture of muslin buffs. The trend has been toward a higher count buff, and 64-68, 80-92, and 84-92 count sheetings are now in general use. Although the initial cost of the higher count buff is greater, the increased wearing qualities offset this so that the net result is generally a substantial saving.

For the final coloring operation a precipitated alumina buffing compound can generally be used to advantage. It should be free not only from ferric oxide, but also from copper and sulphates of all kinds. Green chromic oxide used on a cotton cloth sectioned wheel is sometimes preferred for the final buffing, and talc is also used. Any discoloration from heat or flux along the weld can be removed with tin oxide abrasive if levigated alumina seems to be too harsh.

The high coefficient of friction of chromium-nickel stainless steel frequently results in localized heating during buffing. A sulphur-containing buffing compound must therefore be avoided, or the action of the sulphur on the nickel in the alloy might cause tarnishing.

The chief consideration in buffing 18-8 is to avoid deep scratches and overheated buffs. Tallow, which is a solid at room temperature, or some other lubricant should be used on all operations except the first and final coloring; but the use of too much grease will clog the finish and, of course, no iron or sulphur compound should be in the composition used. Tallow modifies the action of the abrasive grit to produce a satin-like finish. Stearic acid produces a somewhat higher color than tallow gives. The best classes of finishes are produced by first treating with tallow, and following with stearic acid and fresh abrasive of the same size. Beeswax or carnauba wax is often used for a still higher color and burnished appearance.

Recognizing the impossibility of being able to

TABLE II

Surface Speed of Wheel in Feet Per Minute

Speed of Arbor	Diameter of Wheel								
r.p.m.	2 in.	4 in.	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.	18 in.
800	420	840	1,256	1,675	2,175	2,510	2,920	3,520	3,760
900	470	940	1,400	1,885	2,355	2,815	3,290	3,750	4,030
1,000	525	1,050	1,570	2,090	2,620	3,140	3,655	4,170	4,700
1,200	630	1,255	1,880	2,505	3,140	3,775	4,380	5,020	5,640
1,400	730	1,465	2,195	2,930	3,660	4,405	5,120	5,850	6,580
1,600	840	1,675	2,500	3,350	4,190	5,040	5,850	6,670	7,520
1,800	940	1,885	2,830	3,765	4,710	5,670	6,580	7,500	8,460
2,000	1,050	2,090	3,140	4,185	5,235	6,285	7,310	8,340	9,400
2,200	1,150	2,300	3,450	4,600	5,750	6,920	8,040	9,180	10,340
2,400	1,255	2,505	3,770	5,020	6,275	7,550	8,770	10,020	11,290
2,600	1,360	2,700	4,080	5,440	6,700	8,170	9,500	10,820	12,210
2,800	1,460	2,930	4,395	5,850	7,330	8,885	10,220	11,670	13,170
3,000	1,570	3,140	4,710	6,275	7,855	9,425	10,965	12,500	14,100
3,200	1,670	3,350	5,020	6,700	8,370	10,050	11,690	13,320	15,050
3,400	1,780	3,560	5,340	7,110	8,900	10,700	12,500	14,170	15,990
3,600	1,880	3,780	5,650	7,530	9,420	11,220	13,130	15,000	16,920



● This Chicago sheet metal shop has taken on a wider field of business since installing their Lincoln welder, for they now can fabricate everything that is made of sheet metal—mild steel, stainless steel, "tin," aluminum, etc.—weld faster—at a fraction of the usual cost.

Shops everywhere, equipped with this versatile welder are adding a steady load of "side line" work—specialty contract welding that is simple and profitable. This includes the fabrication of grave vaults, storage bins, steam radiator guards, containers, scale pans, machine housings, belt or gear guards, signs, canopies, ventilators, etc. Adding this work to their shop, they are reducing their fixed charges and increasing their profits substantially.

The Lincoln "Junior" operates from your electric power lines for as little as 5 cents an hour. Lincoln large-scale production brings you this welder at a price that can't be beat. Easy terms can be arranged so that you can pay for the welder out of increased profits in a short time. Mail the coupon for details.

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Hand Cutting Is Out! This "Mighty Midget" Unishear Cuts Up To 18 Ga. Hot Rolled Steel, Other Materials In Proportion, As Fast As You Feed.

Trimming Down to "NOTHING"

Trim off a thin, narrow strip with hairline accuracy, or use it for continuous production — both are equally easy if you have a Stanley Unishear!

Plug this "electrically-driven hand shear" in any light socket — cut sheet metal as fast as you feed, without bending or distortion, leaving clean, smooth edges. Use it in the shop or take it right to the work.

Portable or Stationary **Portable Unishears are made in three sizes, to cut 18, 16, or 14 gauge hot rolled steel, and there are stationary models with capacities up to ¼" boiler plate.**

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STANLEY UNISHEARS

THE ELECTRICALLY DRIVEN HAND SHEARS

duplicate the finish on a welded area so that no perceptible difference exists between the adjacent areas, operators have agreed that it is good practice to go over the entire surface of the finished assembly by hand to blend or reduce the surface to a common finish. For this reason metal that has not been finished in the mill is often specified, as it would in any case have to be gone over again by hand.

The speed of the wheel to a great extent determines the finish. The higher the speed the brighter the finish. A wheel traveling at a high surface speed will not cut as fast as the wheel traveling at an ordinary surface speed. The most practical speed for cutting-down is from 4,300 to 5,750 s.f.p.m. For producing a dull or satin effect a speed of from 3,000 to 5,000 s.f.p.m. is most practical. For brighter shades, speeds as high as 7,000 to 15,000 s.f.p.m. have been recommended for buffing with chromium oxide compositions. Hardness of metal also affects the finish.

Ft. Wayne Ordinance

(*Continued from page* 88)

For areas from 50 to 78 square inches, No. 24 gauge; for areas from 79 to 115 square inches, No. 22 gauge; for areas from 116 to 177 square inches, No. 18 gauge, for areas from 178 to 314 square inches, No. 16 gauge; for areas from 315 to 1,017 square inches, No. 12 gauge; for areas from 1,018 to 2,827 square inches, No. 10 gauge.

Section 21. Smoke Pipes, How Installed:

Each such breeching or smoke pipe shall be provided with a proper damper, conveniently located; shall be lock-seamed, welded or riveted, with all joints lapped not less than one and one-half (1½) inches, and be rigidly secured; and shall have proper thimble for making tight connection to chimney flue.

Each such breeching or smoke pipe shall be as short and direct to the chimney flue as possible, and shall be installed with a pitch upward of not less than one-fourth (¼) inch per running foot.

Sulphuric Acid Exhaust

(*Continued from page* 19)

capacity. Particularly is this true of boiling tanks where the vapor sometimes is generated faster than a reasonable amount of air can absorb it.

Tests on certain ducts and fumes have shown as low a velocity as 35 fpm, properly distributed, satisfactorily providing good ventilation.

Certain authorities use another method of determining amount of air required on tank ventilation. The slot size is determined by the width of the tank, 1 inch height of slot per foot width of tank being used. See Fig. 3. A 3-foot wide tank would require a 3-inch height of opening. The velocity through the opening is set at 2,000 fpm, which would result in a tank face velocity of 1/12 of 2,000 or about 166 fpm per sq. ft. Whether the duct work is directed down or up is immaterial in the design of the hood. Many plants prefer the under floor duct systems for their plating room.

Association Activities . . .

Chicago

At the big Mid-Summer three-star trade meeting of the Furnace, Air Conditioning and Sheet Metal Institute held July 16 at 2051 Belmont Avenue, Chicago, Harold Pride and Vern Carns of Minneapolis-Honeywell Regulator Company discussed "Controlling the Air Conditioning Job" supplemented by motion pictures.

John Klunder, guest speaker from the Roofers association, gave first hand information on the million dollar sales tax decision of the Illinois Supreme Court affecting every roofer and sheet metal contractor.

Johnnie Novak represented the entertainment committee.

National

At the 26th annual meeting of the National Association of Sheet Metal Distributors a resolution was unanimously adopted to vigorously protest against any Governmental Agency or Bureau, whether Federal or State, promoting the establishment of Consumer Co-operatives by official sanction, contributory financing, or exemption from taxation or laws regulating the conduct of business. It was further resolved that members be requested to protest to their senators and representatives in Congress, enclosing a copy of the resolution.

The resolutions committee was composed of J. M. Burbank, H. E. Usinger, George O. M. Johnston.

Philadelphia

The Association of Roofing, Metal & Heating Engineers of Philadelphia, extended greetings to all roofing and sheet metal shops in Philadelphia and vicinity with their invitation to the 24th Anniversary Outing at the Oak Terrace Country Club, Welch Road and Willow Grove Park, on June 29th, 1937.

There were special souvenirs for the ladies, with golf, tennis, baseball, quoits and bathing in the daytime. Novelties and prizes were offered.

Banquet at 6:30 p. m. Dr. Philip J. Steinmetz, a noted orator and humorist, was the speaker, followed by a floor show.

The same foil-covered announcement of 32 pages carried reservation slips also for the annual association fishing trip held on July 14 on Jim Boyd's great triple screw angler from Schellengers landing.

Dinner tickets were $2.00 and the Fishing Trip $2.50.

Fred U. Ritter, Secretary.

Chicago

The Warm Air Heating Chicago Golf Association met at the Bunker Hill Country Club, Chicago, on July 22. Scores follow:

J. E. Peterson	100—21—79	Al Naussner	114—20—94
Paul Kraft	112—32—80	Paul Davis	103—14—89
Bill Gierman	121—50—71	Ray Lorenz	102—28—74
Ed. Nemec	117—42—75	Chet Ruth	96—13—83
Bob Wettstein	102—19—83	Lyle Burke	108—20—88
Grant Wilson	109—28—81	D. C. Ellison	94—13—81

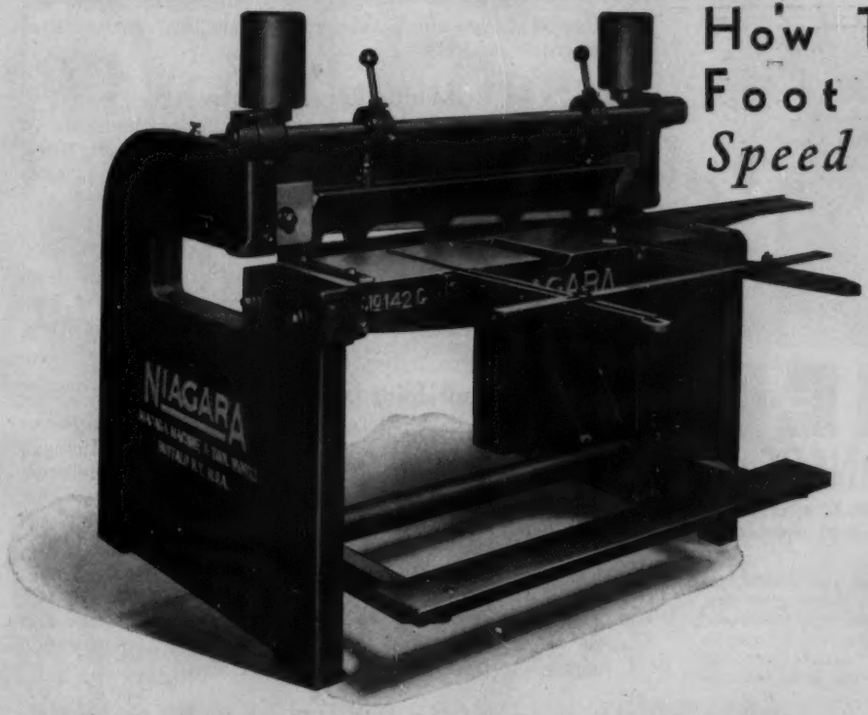
Bill Gierman won the club cup donated by the Northwestern Stove Repair Company.

This association is an organization of supply men and dealers from the Chicago area, interested in relaxing two afternoons a month and in becoming better acquainted socially. Each member pays his own green fees only.

Paul M. Barth, Secretary.

Social Security Application Blanks

Applicants for social security account numbers may now obtain the necessary blank forms and assistance in filling them out at any branch post office or classified substation, even though a Social Security Board field office has been opened in the city where they are located, the Social Security Board announced recently.



How These Niagara Foot Gap Shears *Speed up Your Work*

1. Easy Operation
2. 16 Gage Capacity — 36" to 72" cutting lengths
3. 18 inch Gap
4. Modern Closed Panel Housings
5. Self Locking Steel Hold-down
6. Visible Cutting Line
7. Steel Cross Head
8. Tubular Treadle Mechanism
9. Niagara Alloy Steel Knives
10. Complete with front, side, bevel, slitting and back gages

Niagara Machine and Tool Works, Buffalo, N. Y.

NIAGARA

A Complete Line of Machines for Your Sheet Metal Shop

Folders—Brakes
Groovers—Seamers
Slip Roll Formers
Power Presses

Shears, Squaring, Rotary
Lever Shears—Punches
Machines for Turning, Wiring, Beading, Burring, Flanging

FASTER and CLEANER WORK with a MARSHALLTOWN Throatless Shear



AND we mean it! When you install a MARSHALLTOWN shear in your shop, faster and cleaner work become automatic. Capacities from the lightest gauge to the heaviest, including boiler plate, and all work finished when it leaves the shear. Speed up your production with a Marshalltown shear. It'll result in a faster turnover of business and more economy on jobs. Write us today for more information.

MARSHALLTOWN MANUFACTURING COMPANY
920 East Nevada St.
MARSHALLTOWN IOWA



PREMIER FURNACE CLEANERS

ONE HORSE POWER MODELS $84.50 and $89.50
HALF HORSE POWER MODELS $60.00 and $64.50
COMPLETELY EQUIPPED

Premier Furnace Cleaners are powerful and light weight, yet sturdily built to stand years of rugged service. Weighing less than 50 pounds, they are one-man cleaners and have been the furnace man's favorite for years. Premier Cleaners are ideal for upstairs use and may be used independently from the container for suction and blowing use in cleaning air ducts, registers, grills, radiators and air conditioning equipment.

Motor specifications for these powerful cleaners are:
1 H.P. maximum vacuum 46 inches in water.
½ H.P. maximum vacuum 31 inches in water.

Business-Getting, Return Post Cards are Available for Dealers at Low Cost

Buy It From Your Local Jobber or Write the Manufacturer

Furnace Cleaning Instruction Booklet Free with Each Cleaner

ELECTRIC VACUUM CLEANER CO., INC.
1734 Ivanhoe Road • Cleveland, Ohio

With the Manufacturers . . .



Mansfield President of Barber Burner

At a meeting of the directors of the Barber Gas Burner Company, Cleveland, on June 5, 1937, Harry M. Mansfield, formerly Secretary of the Company, was elected President. Mr. Mansfield succeeds to the position left vacant by the death of Harry E. Kerr.

◆

Luscombe Penn Sales Manager



Robert H. Luscombe was named sales manager of Penn Electric Switch Co., Des Moines, effective June 1, according to an announcement recently released by Malcolm E. Henning, executive vice-president of the company.

◆

Volker Joins Grant Wilson

Edmund Volker has joined the sales force of Grant Wilson, Incorporated, Chicago, in the northern Illinois and southern Wisconsin territory.

◆

Chambliss Now Mercoid Auditor

J. F. Chambliss was recently appointed auditor of the Mercoid Corporation, Chicago, Illinois, manufacturers of automatic controls.

◆

Milcor Representatives

Milcor Steel Company announces the appointment of C. J. Thomas with headquarters at 1207 West Street, Utica, and B. B. Barker at 310 Walnut Street, Elmira, as sales representataives in the New York territory.

◆

Mercoid Appoints New Salesmen

R. M. Keatts and J. F. McCauley have recently been transferred to the sales organization of The Mercoid Corporation, Chicago, after completing a comprehensive training course in the factory.

◆

Paul Joins Lamneck Products

Edward H. Paul has recently joined the organization of Lamneck Products, Inc., as sales engineer for Michigan and eastern territory. For ten years Mr. Paul conducted his own heating and ventilating business in Findlay, Ohio.

◆

Jared A. Smith Niagara Distributor

The Forest City Foundries Company, Cleveland, announces the appointment of Jared A. Smith, of Cincinnati, Ohio, as distributotr for Niagara gas-fired furnaces and winter air-conditioning units. Mr. Smith's territory will include the states of Kentucky and Ohio.

◆

Gar Wood Promotions

Frank H. Dewey, general manager of the air conditioning division of Gar Wood Industries, Inc., Detroit, has named Leon C. Hulse for the position of factory sales engineer of the air conditioning division of the company.

Mr. Dewey also announces the appointment of Stanley E. Chase, as manager of the company's air conditioning division branch at Rochester, New York. S. T. Smith, former branch manager at Rochester, has been transferred to Boston.

With The Manufacturers . .

Kelly Manages Calvert Division

Republic Steel Corp., Cleveland, has appointed F. A. Kelly, manager of the Culvert Division as building products co-ordinator, attached to the general sales department of the corporation. N. J. Clarke, vice president in charge of sales, made the announcement.

◆

Wolverine Tube Opens Dallas Branch

The Wolverine Tube Co., Detroit, Mich., has opened a branch office at 1916 Young Street, Dallas, Texas, for the manufacture of air conditioning and refrigerator tubing.

◆

Lincoln Moves Cincinnati Office

The Lincoln Electric Company, Cleveland, Ohio announces a change in address of its Cincinnati, Ohio, office from 5th and Baymiller Sts., to Room 602, American Building, Central Parkway at Walnut St.

◆

Lincoln Appointments to Chicago Office

The Lincoln Electric Company, Cleveland, announce three appointments to the sales staff of its Chicago Office, 1455 West 37th Street.

The men appointed include Robert A. Wilson, George Mandula and A. T. Cox, Jr.

◆

Airo Supply Moves

Airo Supply Company, Chicago, wholesale refrigeration and air conditioning jobbers, has leased the entire building at 2726-32 North Ashland Avenue, with a floor area of 7,800 sq. ft.

Gar Wood Appointments

Frank H. Dewey, general manager of the air conditioning division of Gar Wood Industries, Inc., Detroit, has promoted Don J. Luty to the office of assistant general manager. Norman Saylor has been appointed manager of the company's Detroit branch.

◆

Stainless Steel Shipments Double

The American Rolling Mill Company, Middletown, Ohio, advises that shipments of stainless steel in 1936 were double those of 1935. W. W. Sebald, vice-president, made the announcement. Indications are, he added, that 1937 sales will be twice those of last year.

◆

Tunnel Exhaust Fans

Buffalo Forge Company, Buffalo, N. Y., has six of the thirty-six Buffalo limit-load fans to be used in the new Midtown or Lincoln vehicular tunnel under the Hudson river at 39th St., New York City, ready for shipment.

W. R. Bylund, Port Authority Engineer, complimented C. C. Cheyney of Buffalo Forge Co. on the splendid design and workmanship. Each fan weighs approximately ten tons.

◆

G-E Home Bureau Expands

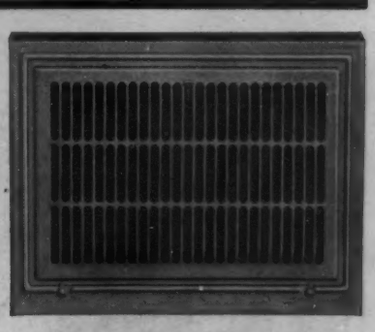
General Electric Company, 570 Lexington Avenue, New York City, is appointing field representatives to act as liason between builders in a territory and the various distributors and offices of the company. They will bring together the builders and the distributors of air conditioning equipment, wiring and construction materials, lighting and home appliances.

The services of the G-E Home Bureau is available for advice on electrical specifications and in checking plans with architects and builders.

What Makes One Register Better Than Another?

Beauty of design is apparent in all AUER Registers—the "Classic" is a favorite with interior decorators. ● Strength is assured both by the stamped steel method and special reinforcing devices. ● Efficiency of operation results from generous open areas and ample deflecting blades. ● Installation is made easy by numerous features for speed and perfect fit.

Measured by any standard, AUER Registers have everything that a fine register should have. Send for Catalog illustrating complete line of Registers, Cold Air Faces, and Grilles for both warm air and air conditioning.



Elite Two-Piece Register



Aristocrat Baseboard Register

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

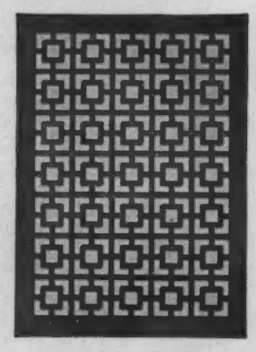
AUER DISTINCTIVE REGISTERS & GRILLES For Air Conditioning *and* Gravity

PERFORATED METALS

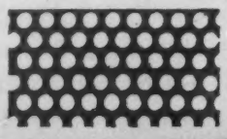
Many designs of Perforated Metal for Architectural Grilles, Radiator Enclosures, Air Conditioners, Cabinets, Safety Guards, and for all screening and sizing operations.

Steel, Stainless Steel, Brass, Bronze, Copper, Monel, Aluminum, Zinc and other metals or materials perforated to your order.

Round holes from .020" to 7". Slot holes from .008" to 3" wide. Square holes of standard sizes. Complete line of brass and tin in small sizes. Prompt Service—Pleasing Prices.



Send us your next specifications.



(Note: Equally spaced holes make for uniform strength, improved appearance and durability.)

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

Never Be Satisfied With Less Than Super Volume And Profit



NO matter how well you are now doing — how busy you are or how much you make — you can do more and make more with a Super Furnace Cleaner. Hundreds of users testify that they made more money—sold more plants and parts—from the day they got on the job with a Super. Biggest measure of performance, lowest operating and upkeep cost, come only to Super users.

The Plan Book tells you how to merchandise your services—to increase your business and income. The free trial offer lets you try it out at our risk. Use the coupon.

USE THIS COUPON

The National Super Service Company
1944 N. 13th Street, Toledo, Ohio

Send me the Plan Book and complete information about your free trial and the new low-priced Super.

Name .....

Street Address .....

City & State.....

With the Manufacturers . .

Sioux Changes Name

The Sioux Falls Corrugating Co., Sioux Falls, S. D., of which Max L. Rysdon is vice president, has changed its name to Sioux Steel Company. The same line of products will be manufactured.

◆

Grant Wilson Announces Northwest Office

Grant Wilson, Inc., Chicago, announces a Northwest office and warehouse at 1607 Hennepin Avenue, Minneapolis. George M. Craig and Frank B. Nimmo are the managers.

◆

Brown Joins L-B Stoker Division

J. E. Martin, general manager of the stoker division of Link-Belt Company, 2410 W. 18th St., Chicago, announces the appointment of H. P. Brown to manage the sale of their electronic Radiostat control system for eliminating overheating and underheating, with corresponding savings in fuel.

◆

Armco New District Sales Office

The American Rolling Mill Company, of Middletown, Ohio, has established a new district sales office at Indianapolis, Ind.

Austin Edwards, for many years associated with the Middletown sales district, has been named manager of the new Indianapolis district.

◆

Amends Corporate Name

The Riester & Thesmacher Company, 1526 West 25th St., Cleveland, is the amended corporate name of the R & T Company. There is no change in the personnel or business structure, and the concern continues to operate two distinct divisions of the business.

Plant No. 1 fabricates sheet metal products for the automotive, radio and electrical fields, while Plant No. 2 is devoted to building sheet metal work including architectural sheet metal, art metal hollow metal doors and partitions, heating and ventilating ducts, etc.

The company has recently been appointed authorized distributors for Westinghouse Air Conditioning and is prepared to give complete service in the execution of this work, including engineering.

◆

Owens-Illinois Advertising Campaign

The Owens-Illinois Glass Company, Toledo, Ohio, Industrial and Structural Products Division, is helping the "furnace man" to stoke his sales firepot with an interesting trade-publication advertising campaign.

"Sell Winter Air Conditioning First; then Your Furnace Will Sell Itself," is one of the opening thoughts of the campaign. Prospects, it is explained, are more interested in what a modern heating unit will do for them rather than how it is built.

The campaign urges furnace men to "Step out. Shake hands. Get better acquainted with architects and builders, the men who influence sales."

The furnace dealer of yesterday has become the winter air-conditioning expert of today, the series points out. The furnace dealer now is a merchandiser, a salesman. He's selling health and comfort, not just so many feet of iron and steel.

Urging furnace dealers to "be on the job" at Sunday inspections of new homes, The Owens-Illinois series will cite survey examples of how alert dealers have been able to reap a greater profit, through personal contact with interested prospects, than that made by the builder of the house.

The series also will describe how furnace dealers can obtain official data showing the number of prospects there are in his territory.

News Items . . . . . .

Hummel Has Good Season

Chas. Hummel, sheet metal shop, 102 North Tenth St., Fort Smith, Arkansas, reports a very good winter season in roofing and also has completed some ventilation work in the border city.

◆

Willis Has Good Display

J. F. Willis, sheet metal works, at Peace and Halifax Sts., Raleigh, N. C., shows a very good floor and window display in ventilator, skylight, and metal roofing. It also shows the Wise hot air furnaces and has an air conditioning department. The season has been quite active.

◆

Promotional Literature

Jack Stowell, 133 Galena Boulevard, Aurora, Illinois, is using mimeographed advertising letters to his prospective customers. One offers to clean furnaces for a small charge of $2.00 and quote prices on other jobs. Another describes his winter air-conditioning units. A return postal, postage prepaid, is enclosed, offering a free consultation.

◆

James W. Hunt

James W. Hunt, founder of the Hunt Brothers Sheet Metal and Air Conditioning Company, Kansas City, Missouri, died recently, at the age of 74.

Mr. Hunt founded the Westport Hardware store bearing his name at 523 Westport Road in 1887, and from this developed the sheet metal business now operated by three of his four sons—Arthur W., John F. and Robert L.

In 1920 Mr. Hunt retired from the growing sheet metal company and turned it over to his sons. He continued, however, to operate the hardware store. He is survived by his widow, a daughter and four sons.

Simplex Buys Plant

The Simplex Manufacturing Co., manufacturer of roof flashings, ventilators, etc., of Chicago, has purchased the old Rosenthal woodworking plant on Main street in Fond du Lac, Wis., and will remodel at a cost of about $5,000 for its own occupancy.

◆

Brooks & Son Purchase Building

J. W. Brooks and Sons, sheet metal and furnace firm of Chattanooga, Tenn., have purchased the building at 1200-1202 Carter St. The firm which has occupied the building for some time plans extensive improvements and repair. It is a three story structure with basement. It was purchased from the estates of A. T. and A. V. Whiteside for a consideration of $7,500.

◆

News Briefs

Wallace Candler, Inc., 9000 Roselawn Avenue, Detroit, Mich., has been incorporated to do a roofing and sheet metal business, with a capital of $30,000, of which $13,000 has been paid in.

◆

Durgin & Son, dealers in roofing, insulation and sheet metal in the Twin Cities, has established a branch office at 222 First Avenue North, Moorhead, Minn., under the management of Mike Duginski, formerly of Winnipeg.

◆

The American Air Conditioning Corporation has been chartered in Sebastopol, Cal., with a capital of $25,000, by H. Fahner, of 519 California St., San Francisco.

◆

H. J. Caven has sold the business of Grand Sheet Metal Works, Port Orchard, Wash., to J. Haas.

◆

The Hanan Plumbing & Sheet Metal Works has engaged in business in Lakeview, Ore., under management of J. E. Hanan.

NuDRY FURNACE CEMENT

NuDry Furnace Cement is ideal for winter jobs and prevents smoking joints.

NuDry is best because it comes to you in dry form, takes less material to set a furnace, DOES NOT CRACK, POWDER OR BLOAT WHEN FURNACE IS FIRED IMMEDIATELY AFTER APPLIED, will not shrink, keeps joints tight at all times, withstands high temperatures, and is not affected by temperature changes. It will not harden in containers and generally requires only half the usual amount of cement to complete a job.

Check the following jobbers and furnace manufacturers for your nearest supply of NuDry.

JOBBERS HANDLING NU DRY CEMENT

Akron, Ohio.
XXth Century Heating and Ventilating Co.
Baltimore, Md.
Wanner Brothers.
Buffalo, N. Y.
J. M. & L. A. Osborn Co.
Minet Heating Supply Co.
Canton, Ohio.
Grant Totten, Inc.
McCurdy Furnace & Fdry. Co.
Cincinnati, Ohio.
Cincinnati Stamping Co.
The Huenefeld Co.
C. H. Schrader Co.
Cleveland, Ohio.
Decker-Reichert Steel Co.
Famous Furnace Co.
Forest City Foundries Co.
Furnace & Boiler Parts Co.
Henry Furnace & Foundry Co.
J. Kinsner & Sons Co.
Ohio Sanitary Specialty Co.
J. M. & L. A. Osborn Co.
Columbus, Ohio.
Munkle Heating Co.
Vorys Brothers, Inc.
Dayton, Ohio.
Direct Plumbing Co.
Detroit, Mich.
Detroit Safety Furnace Pipe Co.
Ideal Furnace Co.
J. M. & L. A. Osborn Co.
Elmira, N. Y.
Irving D. Booth, Inc.
Erie, Pa.
Erie Concrete & Steel Supply Co.
Milloy Lumber Co.
Fort Wayne, Ind.
Wayne Pattern & Foundry Co.
Grand Rapids, Mich.
Behler & Young Co.
W. C. Hopson & Co.
Lansing, Mich.
The Contractors Supply Co.
Peoria, Ill.
F. Meyer & Bro. Co.
Philadelphia, Pa.
Central Stove Repair & Foundry Co.
Fox Foundry & Supply Co.
McMullen-Weber, Inc.
Pittsburgh, Pa.
W. F. Angermyer Co.
Berger Supply Co.
Demmler Brothers Co.
Follansbee Brothers Co.
Henry Furnace & Foundry Co.
A. H. Johnson Co.
Proie Brothers Furnace Co.
Heating Supply Co.
Shamblen Furnace Parts Co.
Ravenna, Ohio.
Ravenna Furnace & Heating Co.
Rochester, N. Y.
Follansbee Bros. Co.
St. Louis, Mo.
A. G. Brauer Supply Co.
Hammond Sheet Metal Co.
Toledo, Ohio.
C. F. Throm & Sons
Utica, N. Y.
Great Eastern Distributors, Inc.
Warren, Ohio.
The Reed Iron & Steel Co.
Youngstown, Ohio.
Banner Repair Parts Co.

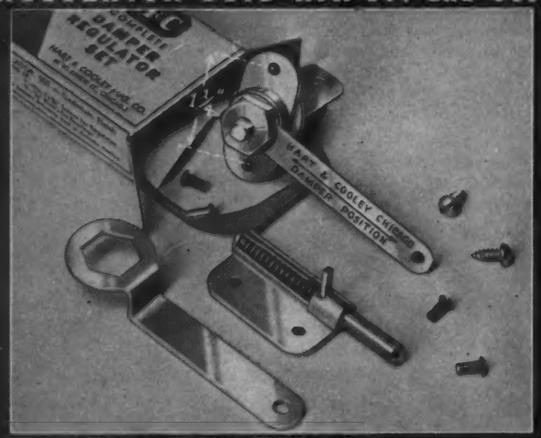
THE PYROLITE PRODUCTS COMPANY 1221-31 W. 74th St. CLEVELAND, OHIO

IF IT'S REPAIR PARTS

to fit any Furnace, Boiler, Stove, or Air Conditioning Equipment, of any make or kind, that must fit exactly, and of course be of the finest quality, let Peninsular supply them. Buying from Peninsular is your assurance of perfect merchandise the first time and all the time . . . of immediate shipment, and prices that are right. Investigate! Try your next order with Peninsular.

PENINSULAR STOVE COMPANY
2699 Gratiot Ave. Detroit, Mich.

H&C *Improved* DAMPER REGULATOR SETS Nos. 50¼ and 50⅜



for NEAT, SECURE, CONVENIENT INSTALLATIONS

- Dampers are held securely, no turning, end-play or vibration.
- Can be installed in any position — near edge of duct — on round or flat duct.
- Handle always indicates position of damper — may be removed to prevent tampering with adjustment.
- Threaded bearing has one-piece, unbreakable, steel shank — case-hardened to prevent wear — removable washer for easy riveting.
- Made in ¼-inch (No. 50¼) and ⅜-inch (No. 50⅜) sizes. ¼-inch snap end bearing permits easy installation of small dampers without bending. No. 50⅜ has solid end bearing. Wrenches furnished free.
- See them at your jobbers' or write for free sample.

HART & COOLEY MFG. CO., 61 W. KINZIE ST., CHICAGO

—News Briefs—

Harry H. Flemington has a contract for air conditioning the Coronado Hotel, 400 East Ninth Street, Tucson, Ariz.

◆

A. N. Endell has established a new sheet metal works in Porterville, Cal., at 210 Cleveland Street.

◆

The Copper Roofs Company has engaged in the roofing business at 2020 North Lamar Street, Dallas, Tex.

◆

The Viking Air Conditioning Co., Dallas, Tex., has moved from 2320 Summer Street to 1818 Main Street.

◆

The Cooling & Heating Equipment Co. of Omaha has been chartered in Omaha, Neb., with a capital of $10,000, by Morton Lipsey and Edward Cline.

◆

The Domestic Air Conditioning Co., of Highland Park, Mich., has incorporated at 2 Bartlett Avenue under the style of F. E. Ritzenhein, Inc.

◆

The Home Heating & Equipment Corporation has been incorporated in Walla Walla, Wash., with a capital of $6,500, by J. K. Jones, James L. Riley and Jacob Schafer.

◆

Julius O. Thompson, who has been engaged in the heating business in Osseo, Wis., for the past 28 years, has engaged in the same line of work in Spooner, Wis.

◆

L. H. Hancock & Co., ventilating equipment, Dallas, Tex., has moved from 612 East Jefferson Street to 212 of the same street.

◆

The B. O. Jessen Sheet Metal Works, 1798 E. Jefferson Blvd., Los Angeles, Cal., has let the contract for the erection of a sheet metal shop at 1700 E. Jefferson Blvd.

◆

The Arizona Plumbing & Metal Co. has a contract for a cooling plant in the Roskruge Hotel, 57 S. Scott St., in Tucson, Ariz.

◆

The Weather Strip Specialties Co. has been formed with place of business at 5509 Lexington Avenue, Los Angeles, Cal., by James C. Carpenter and Ainsley J. Ashburn.

◆

The James S. Arthur Co. has moved its air cooling business from 2204 Cedar Springs to 6820 Snider Plaza, Dallas, Tex.

◆

The Medford Sheet Metal Works has engaged in business in Medford, Ore., under the management of O. J. Wolfe.

◆

Fred W. Dee is building a $1,200 addition to his sheet metal shop at 1732 East Fourteenth Street, Los Angeles, Cal.

◆

The J. M. Tull Metal & Supply Co., Atlanta, Ga., is erecting an $80,000 plant adjoining its present building at 191-197 Marietta Street.

◆

The Vermont Sheet Metal Works has engaged in business at 3741 S. Vermont Ave., Los Angeles, Cal., under the management of Leonard I. Tornell.

◆

W. A. Nicholson and Jack Myers have engaged in business at 1509 S. E. 35th Avenue, Portland, Ore., under the style of Willamette Sheet Metal Works.

◆

The Carrier Corporation, 743 E. Washington Blvd., Los Angeles, Cal., will install an air conditioning system in the Bank of America building in Fresno, Cal.

◆

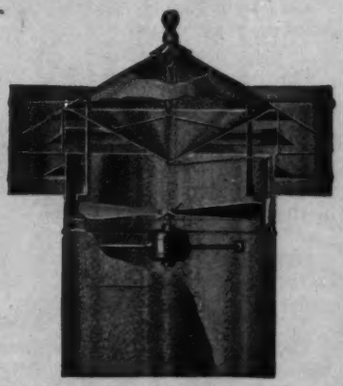
R. B. Spencer has sold his interest in the sheet metal business of Spencer & Lund, 1520 Commerce, Tacoma, Wash., to his partner, A. G. Lund.

◆

G. W. Wegmiller, a resident of Duluth, Minn., for the past 35 years, has engaged in business under the style of Arrowhead Sheet Metal Shop, at 410 N. Central Avenue, West Duluth, Minn.

Burt "Forst-Aire" Fan Ventilators

Afford These Great Advantages



- They move five to six times as much air as gravity type ventilators; consequently—
- Installation and maintenance costs are much lower.
- They impose less weight on the roof.
- Present better appearance as fewer units are needed.
- Action is always positive and determinable.

Burt makes a type and a size for every purpose. Write for descriptive bulletins.

The Burt Mfg. Co.
301 MAIN STREET AKRON, OHIO

KREHBIEL . . .
FURNACE CEMENT

A New Superior Asbestos Furnace Cement which will withstand temperatures far beyond ordinary furnace temperatures. Compounded to give easier and more rapid application. Write for samples and literature.

J. H. KREHBIEL CO.
425 No. Pulaski Rd. Chicago, Ill.



X-RAY VIEW

On every house these metal parts should be copper. More houseowners than ever are asking for copper. Recommend it! Revere Sheet Copper will give them lifetime service. Plain or lead coated. Sheets, rolls, strips. Ask your distributor for it.

Revere Copper *and* Brass
INCORPORATED
FOUNDED BY PAUL REVERE 1801
EXECUTIVE OFFICES: 230 PARK AVE., NEW YORK CITY

Good Investments!

Whitney Tools Make Profits for You



Nos. 7, 7½, 8
IMPERIAL
ROLLER BEARING
PUNCHES

● Ideal for standing seams, skylight work, and similar jobs. They punch AND STRIP inside 90°! Roller bearing, no cams, positive eccentric connection, easy-to-change punches and dies. Capacities, ¼" hole in ⅛", 3/16", and ¼" metal.

No. 455 ANGLE IRON
COMBINATION
SHEAR - NOTCHER - BENDER

● For fast, accurate cutting, notching, and bending of angle iron up to 2" x 2" x ¼". This complete unit is a handy tool to take out on the job or use in the shop. Combines three of our most popular tools on a sturdy stand.



Write for Catalog Showing Our Complete Line

THE WHITNEY METAL TOOL CO.
91 FORBES ST. • ROCKFORD, ILL.

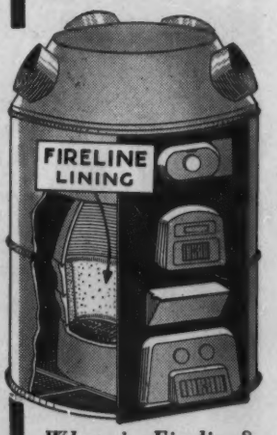
PROTECT *all* Fire Pots... OLD *and* NEW

more profit for you!

In view of recent developments in refractory materials, no up-to-date heating man can O. K. as "perfect" a furnace without a modern refractory lining. Firepots that can burn out are out-moded. Furnaces without a refractory lining cannot attain maximum efficiency for a refractory lining burns fuel hotter (gives more heat) burns more thoroughly (reduces smoke, soot, and ashes), is more economical (gives more heat from less fuel—cuts coal bills as much as 20%).

Give your customers *complete* jobs. Line every firepot, old or new, with Fireline. Use it to make cracked and broken firepots gas tight, to protect new castings against burning out. Step up heating efficiency and at the same time make an extra profit on every furnace.

If Fireline is new to you, write for Free Sample, installation data, cost and selling price, etc. Don't delay . . . it's costing you money!



What is Fireline?

Fireline is *not* a furnace cement, is *not* a patching material. Fireline is a new thing—a plastic refractory material that comes ready mixed in air-tight drums. Molded entirely around the walls of the firepot, it sets with an ordinary fire into a one-piece fire brick lining.

Fireline Stove & Furnace Lining Co.
1866-H Kingsbury St., Chicago, U. S. A.

FIRELINE



Twice the Power One-Man Unit

Now is the time . . .

TO CLEAN UP WITH A

KENT

DOUBLE SUCTION

Your shop needs the Kent Double Suction Cleaner. Why? Because you get:

A BETTER JOB IN LESS TIME
A MACHINE FAMED FOR ITS LONG LIFE
UPKEEP COST AT A MINIMUM

Investigate the Kent. It will mean money for you. Write today.

THE KENT COMPANY, INC.
167 CANAL ST. ROME, N. Y.

for BOILER FURNACE AND STOVE REPAIR PARTS
A.G. BRAUER SUPPLY CO. 316 N. THIRD ST.
ST. LOUIS, MO.

—News Briefs—

The Amic Sheet Metal Works has opened a shop at 505 Alaskan Way, Seattle, Wash.

◆

The American Plumbing & Heating Co. has been established at 101 N. La Brea Avenue, Los Angeles, Cal., by Ralph E. Rippe.

◆

Berner & Swerking, 550 Court St., San Bernardino, Cal., has a contract to install a $21,000 air conditioning system in the Anderson Building, in that city.

◆

Simonton & Co. has engaged in the heating and manufacturing business at 2411 S. E. Belmont, Portland, Ore., under the management of F. M. Simonton.

◆

The Sutherland Air Conditioning Corporation, St. Paul, Minn., has moved its offices from 385 Minnesota Street to 622-E, First National Bank Building.

◆

The ordinance of Sioux City, Ia., regulating installation of furnaces is about to be amended to make the license fee $50 and the bond required of each dealer would be for $2,000.

◆

The Industrial Air Conditioning Co., Inc., has been chartered in Minneapolis, Minn., to deal in air conditioning equipment, by C. F. Wheaton, Beatrice Wheaton, and G. F. Wheaton, all of Minneapolis.

◆

The Associated Sheet Metal Co. has opened a shop at 1362 South Fairfax Avenue, Los Angeles, Cal., and George L. Gardner will have charge of the shop and Sid Morhar will be in charge of estimating.

◆

The American Sheet Metal Works, Inc., Northeast 11th and Glison Streets., has let the contract for erection of a sheet metal plant on Northeast Ninth and Tenth Avenues, Portland, Ore.

◆

The de Jongh-Howells Air Conditioning Corporation has been chartered in Los Angeles County, Cal., with capital of 20,000 shares, by David P. Howells, Ivan L. de Jong and B. J. Daline, all of Los Angeles, Cal.

◆

The Marley Company, 1915 Walnut Street, Kansas City, Mo., has leased a building at 930-940 West Eighth Street, for the manufacture of cooling towers and air conditioning equipment.

◆

The Alemite Company of the Northwest has engaged in the wholesale radio, refrigeration and heating equipment business at 315 N. W. 10th Avenue, Portland, Ore., under management of James J. and V. Gravley.

◆

The Mason Furnace Co., formerly located at 2945 Lyndale Avenue, Minneapolis, Minn., has moved south to larger quarters at 908-910 West Lake Street, where a large display floor has been opened to show the different types of equipment.

◆

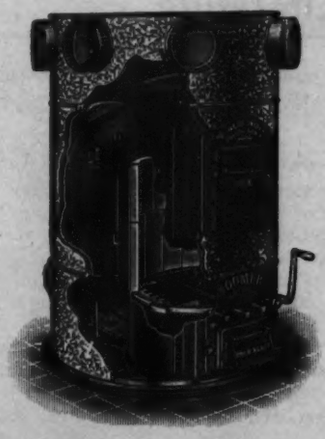
F. R. Ray, 1637 Compton Ave., Glendale, Cal., is authority for the statement that a factory building on a 12-acre site is soon to be built at that point, for General Controls Company, manufacturers of temperature, pressure and flow control equipment.

◆

The Dayton Rogers Manufacturing Co., metal stamping, with offices at 1845 East Franklin St., Minneapolis, Minn., has let the contract for a $25,000 factory building at 2823 13th Avenue S. Dayton A. Rogers is president of the company.

◆

The Carney Heating Service, which has been in Winona, Minn., for the past six years, is erecting a three-story building at 601 Main Street for its expanding business. The business is owned by Albert R. Carney and his sons, Floyd W. and Ralph L. Carney.



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 23 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 23 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.
Massillon, Ohio



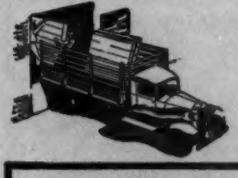
ONE LIBERT SHEAR—
Not Several Shears!

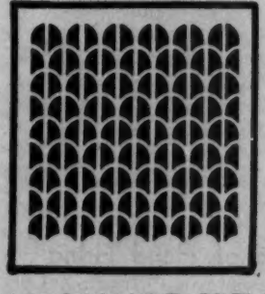
Meets all requirements for cutting IRREGULAR SHAPES—standard equipment furnished for ring and circle cutting . . . absolutely accurate and easily operated . . . metal is sheared and not punched . . . cut anywhere, no starting holes required for inside cutting . . . only one adjustment for various thickness of material used . . . unobstructed cutting vision . . . no further finishing required. No special cutters, pilots, templates, or strippers are needed . . . long life shear blades. Write for complete information.

LIBERT MACHINE CO. Green Bay, Wisconsin
Manufacturers of shears since 1915

Libert Method

CLINTON
PERFORATED METAL
GRILLES
Arrive on Time





Metals in standard sheets, sizes and gages are kept in stock. Dies are always in condition for use. Wickwire Spencer has the facilities for and realizes the importance of closely following the customers' schedules. In extreme cases, grilles have been shipped within twenty-four hours after all information was in the shop. The buyer of grilles needs this type of service.

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd Street, New York
Buffalo Worcester Chicago San Francisco

Clinton Grilles are regularly made in various gages of steel, brass, bronze, monel and Wissco Bronze, and are available up to 60" x 156" in all finishes. Send for the new GRILLE FOLDER that gives full information.

WICKWIRE SPENCER perforated metals

VICTOR HEAT BOOSTERS

COLD ROOMS CURED IN 3 MINUTES





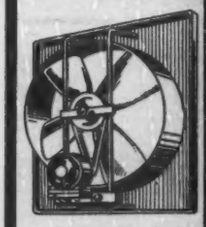


Results Guaranteed

Don't let a sluggish warm air system worry you—install a Victor Heat Booster at the register of the cold room and your troubles will be over. It takes only 3 minutes to put the Booster in place and a connection to the nearest electric outlet completes the job. The powerful Victor fan pulls out the cold air "cork" and brings the heat up in a hurry. Four out of five homes need a Victor Heat Booster—help yourself to extra profits by demonstrating it to your prospects. Write for free folder and dealer prices, today!

VICTOR ELECTRIC PRODUCTS, INC.
738 Reading Road Cincinnati, Ohio

INTERNATIONAL
FANS & SYSTEMS



Complete industrial line. Important installations in many fields. Full information on models, diameters, and capacities upon request.

INTERNATIONAL ENGINEERING, Inc.
DAYTON, OHIO

Furnace Repairs

Prompt Shipments

New Catalogue—Just Out
WRITE FOR YOUR COPY TODAY

BANNER REPAIR PARTS CO.
Youngstown, Ohio

How to Sell Furnaces and Repairs
WITH
The TORNADO Furnace Cleaner



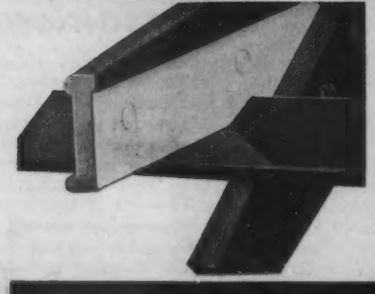
The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too!

Dealers say that the TORNADO is the most powerful furnace cleaner built. Leads the field! Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters Lab. Thousands in use.

Write now for complete information.

Breuer Electric Mfg. Co.
865 Blackhawk Street, Chicago, Ill.

Viking SHEARS



Every pound of pressure on the handles of a Viking Shear is multiplied 20 times at the cutting edge. A Viking weighs 22 lbs., is sturdily built and the specially tempered blade has a long life. Select a Viking for a life time of clean cuts.

VIKING SHEAR CO. ERIE, PA.

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 108.

211—Attractive Round Oak Catalog

Round Oak Company, Dowagiac, Michigan, presents their complete line of heating and air conditioning units in a new 8½x11 in. plastic binding catalog, (No. 10-37) telling in pictures and text their complete story.

All 54 pages are in color. The index on page two lists the products covered—air conditioning units, both oil and coal with or without stoker; oil burners; Moistair furnaces; Thrift Steel "T" Series; 3-Way Systems; room heaters; and automatic controls.

◆

212—Data Sheet on Monel Roofing

The International Nickel Company, Inc., 67 Wall Street, New York City, has prepared a time saving data sheet on Monel as a roofing material. It contains detailed technical information of value to the architect, builder and roofing contractor.

While Monel is a more or less newcomer into the field of general roofing materials, some applications are described in the data sheet which they say are more than a quarter of a century old.

The sheet is illustrated and in convenient size for filing in standard architectural filing systems.

◆

213—Heating Plant Cleaner

The National Super Service Co., 1946 N. 13th St., Toledo, Ohio, is distributing a 4-page dealer folder, illustrating and describing the Super Red Streak Suction heating plant cleaner. Advertising helps with dealer imprint are offered.

A two-page circular is available for manufacturers and jobbers.

Another 4-page folder is entitled "It Pays to Clean the Red Streak Way." This folder gives the results of questionnaires answered as to amount of other work—new fire pots, re-sets, new grates, smoke pipes, and entirely new heating plants—sold as a result of every 100 plants cleaned. There are a number of testimonials from cleaner owners.

◆

214—Selling Program

The Cleveland Steel Products Corporation, Cleveland, O., has published "How Far Will You Go?" a new book which gets down to brass tacks in outlining a new selling program for oil burner dealers. It is factual, simple, practical, and the methods it presents are based on fourteen years' experience in all phases of oil burner merchandising.

The dealer is told how he can create an identity for his place of business and is given specific suggestions for taking advantage of the increasing demand for oil heating. Every step of the selling process from finding the prospect to closing the sale, is carefully analyzed and explained. The book shows specific examples of effective letters and sales literature, newspaper advertising and displays, and tells how to use them to build business.

◆

215—Alternate Method of Hand Firing

Appalachians Coals, Inc., Transportation Building, Cincinnati, Ohio, is distributing an interesting booklet, "Which End?" telling how to obtain "a comfortably heated home and full value for every fuel dollar." It gives helpful hints on smokeless firing by the "alternate method," the scientific answer to the problem of smoke.

Describing the "alternate method" of firing, "Which End?" states that "this scientific method exposes a minimum of fresh coal surface to the maximum amount of live coals, producing practically the same results as when fuel is fed from below" by means of an underfeed stoker. This method of hand firing, the text advises, "permits gases to be burned as rapidly as they are released from the coal, thus preventing smoke."



The
DUR-A-BLE WARM AIR FURNACE

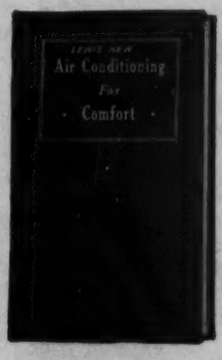
Another unit of the Grand Prize Line! An all cast furnace that you will be proud to install.

Furnished with round casing or enameled "easy to erect" rectangular cabinet.

New literature on the complete line is now available. Ask for it!

Home Comfort Furnace & Mfg. Co.
2901-11 Elliot Avenue St. Louis, Missouri

KNOW AIR CONDITIONING



Learn every phase of this important subject by sending today for a copy of

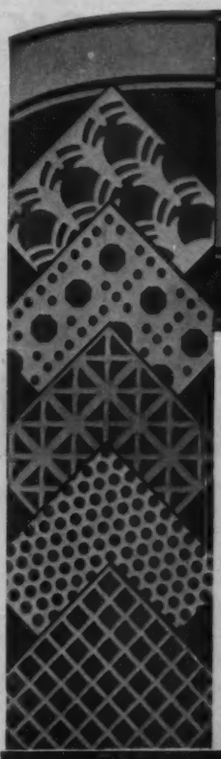
LEWIS' NEW
"Air Conditioning for Comfort"
by SAMUEL R. LEWIS

277 *Pages*—$2.50
Large Psychrometric Chart

So understandably does this new volume cover all angles of air conditioning that already dozens of schools teaching air conditioning have adopted it as a text. From it anyone may quickly acquire a thorough knowledge of equipment, psychrometry, refrigeration, humidification, dehumidification, heat transmission, heat absorption, air distribution, and water circulation. It also explains every step in the design of a complete heating and cooling system for a typical residence and a typical commercial building.

Send $2.50 for a copy today. You may return the book and your money will be refunded promptly if it does not prove satisfactory in every way.

KEENEY PUB. CO. • 6 N. MICHIGAN • CHICAGO



INDUSTRIAL PERFORATED METALS ORNAMENTAL

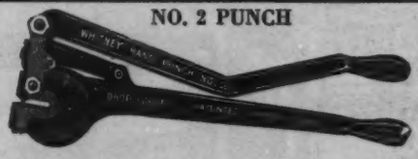
The H. & K. line offers a wide selection of ornamental and decorative grilles for public and private buildings suitable for radiator enclosures, ventilators and air conditioners. Write for Booklet No. 30.--Industrial screens for grading and separating many products -- for safety guarding and other uses. Unusual specifications carefully executed.

ANY METAL
ANY PERFORATION

The Harrington & King PERFORATING CO.
5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

WHITNEY LEVER PUNCHES

NO. 2 PUNCH



Length 23". Capacity $\frac{3}{16}$" through ¼" iron, weight 13 lbs., depth of throat $1\frac{1}{16}$". Punches and dies $\frac{3}{32}$" to ½" by $\frac{1}{64}$".

No. 4-B PUNCH



This punch for sheet metal work has a capacity of ¼-in. through 16 gauge. Weight 3 lb. Length 8½-in. Depth of throat 2-in. Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W. A. WHITNEY MFG. CO.
636 RACE ST ROCKFORD ILL

FURNACE REPAIRS

A FULL STOCK

Every kind of repair part to fit that you may need is ready, awaiting your order at Central. Central parts make repair jobs easier, and easier repairs mean more profits. Write for full information and catalogue today.

CENTRAL
FURNACE & STOVE REPAIR CO.
3937 Olive St. St. Louis, Mo.



WISS
SCROLL-PIVOTER
SNIP

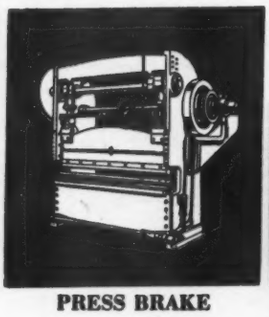
CUTS RINGS AROUND OTHER SNIPS

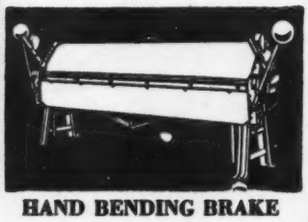
CUTS CIRCLES, SCROLLS AND SQUARES AS EASILY AS A STRAIGHT LINE—WILL CUT ALLOY METALS

Use Wiss Hy-Power and Bulldog Snips

J. WISS & SONS CO., NEWARK, N. J.
Established 1848

CHICAGO





PRESS BRAKE HAND BENDING BRAKE

Steel Brakes—Presses—Shears

DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

SAVES YOU MONEY



Lyonore Metal saves repairs and maintenance costs by retarding the corrosion rat from gnawing in. Outlasts by years other sheet metals of comparable price. You save most when you get the best--insist upon Lyonore Metal for all sheet metal work. Send for details.

LYON, CONKLIN & CO., Inc.
Baltimore, Maryland

Lyonore Metal
CHROMIUM • NICKEL • COPPER • IRON ALLOY

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 108.

216—Perfex Twin Contact

Perfex Controls Company, 415 W. Oklahoma Place, Milwaukee, is distributing issue No. 2 of Perfex Twin Contact, their new house organ.

217—Register Pocket Manual

United States Register Co., Battle Creek, Mich, is distributing U. S. Warm Air Register Pocket Manual No. 27, showing their gravity and air conditioning registers, with data and list prices.

218—Properties of Alloys

Revere Copper and Brass Incorporated, 230 Park Avenue, New York City, has recently published a chart entitled "Chemical and Physical Properties of Revere Alloys," which condenses on a file-sized sheet a great deal of information.

219—Recording Instrument Folder

Practical Instrument Company, 2717 N. Ashland Avenue, Chicago, Ill., has issued a new folder describing portable recording thermometers and electrical operation recorders. The instruments are used in the refrigeration, air-conditioning and heating industries.

220—New Mercoid Sales Brochure

The Mercoid Corporation, 4213 Belmont Avenue, Chicago, Illinois, has just issued "Built to Endure," a new 16-page sales brochure, devoted to a class presentation of Mercoid products. Bound in spiral binding, this book illustrates and describes Mercoid controls that "have grown up with the development of automatic heat."

221—Self-Insulating Wall

The Insulite Co., Minneapolis, Minnesota, is distributing a broadside illustrating and describing the Insulite self-insulating wall of protection, built in either of two ways—with Bildrite sheathing outside and Lok-Joint lath inside, or Bildrite sheathing outside and Insulite for interior finish.

Insulite interior finish products are: tile, plank, building board and HardBoard in various sizes and contrasting colors and finishes. Burning, stenciling and staining may be used to carry out individual treatment.

222—24-Hour Conditioning

Perfection Stove Company, Inc., 7609 Platt Avenue, Cleveland, is distributing a new 12-page catalog entitled "Constant Air Conditioning," covering their Superfex oil-burning heating plants.

The theme is "24-hour air conditioning, not just eight." The Superfex plants, including one for small homes that is shipped completely assembled in such a way that it can be taken through a standard doorway, operate on an "automatic high-low control of the continuous fire, and automatic high-low blower control," circulating conditioned air throughout the entire 24 hours.

There are three models with heating capacities ranging from 65,000 to 140,000 B. T. U. at the registers.

223—New Pillow Block Catalog

Randall Graphite Products Corporation, 609 West Lake St., Chicago, has just issued the 1937 catalog, with complete specifications and installation data on six types of pillow blocks, including a new universal-position model.

Five of the bearings are of the self-aligning type. Of these, the Standard and Pedestal models have single reservoirs, while the double reservoir oil return feature is offered in three models, the D.R.O.R., the D.R.O.R. flange type and the D.R.O.R. Universal. There is also a D.R.O.R. Rigid pillow block.

The catalog is especially designed for the convenience of engineers, superintendents, shop foremen and others.

REPAIR PARTS?

. . . to fit every make and description of heating or cooking unit may be secured immediately upon order . . . and you can bet that if it's the finest quality at a low price you are seeking . . .

CAPITOL HAS IT!

CAPITOL FURNACE AND STOVE REPAIR CO.
229 So. Meridian, Indianapolis, Ind.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Stock List

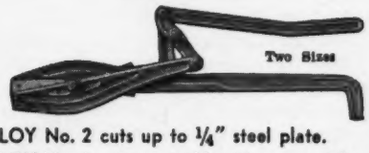
JOSEPH T. RYERSON & SON INC

CHICAGO DETROIT · MILWAUKEE ST. LOUIS · JERSEY CITY CINCINNATI · BUFFALO CLEVELAND · PHILADELPHIA BOSTON

SHEETS

PORTABLE SHEARS

ALL-ALLOY



ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

FULLY GUARANTEED

BREMIL MFG. CO. Erie, Pa.

SALTS OR PASTE?

Either IF IT'S GOOD OLD TRADE MARK BURNLEY



The Paste is ready to use—the Salts need a little water—you'll know how much for that's experience. Whichever you choose you can be sure that you have made a good choice. Write for sample—buy from your Jobber.



Burnley Battery & Mfg. Co • North East, Pa.
Soldering Paste, Salts, Solution, Stick

Victor heating equipment is a line that enables you to buy all your requirements from one reliable source.



This Victor demonstrator enables Victor dealers to close sales at a profit. Investigate this money making line. Write or wire.

HALL-NEAL FURNACE CO., Indianapolis, Ind.

NEW! SKILSAW DISC SANDERS



TWO POWERFUL MODELS FOR HEAVY DUTY AND CONSTANT PRODUCTION SERVICE

• These two 7 in. SKILSAW Disc Sanders incorporate everything that is new in fine portable tool construction. Their compact streamlined design, power and engineering refinements bring a new standard of performance to this field. Compare every feature and you will choose one of these tools for all sanding and grinding work now done by slow, costly hand methods. *See them at your distributors!*

SKILSAW, INC. Dept. E, 3320 Elston Avenue, Chicago

214 East 40th Street, New York · 52 Brookline Ave., Boston
1429 Spring Garden, Philadelphia
312 Omar Avenue, Los Angeles · 2065 Webster Street, Oakland

HEATING MEN

BE READY for the EARLY FALL BUSINESS

with a

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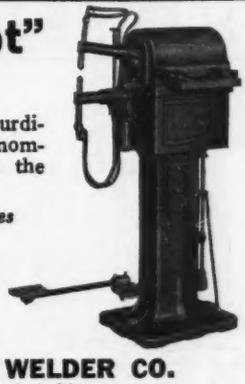
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New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on this page.

224—Cutting Stainless—and Nickel Clad

The Linde Air Products Company, 205 East 42nd Street, New York City, in the July, 1937, issue of Oxy-Acetylene Tips gives procedure for the oxy-acetylene cutting of stainless-clad and nickel-clad steels.

225—Showdown Economy with Coal

Econocol Stoker Co., Div. of Cotta Transmission Corp., 2340 Eleventh Street, Rockford, Illinois, is distributing a visual sales manual with photography by Shigeta-Wright of Chicago, using professional models. A comprehensive story is told of the advantages of stoker-firing with emphasis on Econ-O-Col superiorities.

The Econ-O-Col Stoker is built in sizes to supply heat and power for homes, apartments and commercial installations.

226—Protex for Polished Metals

Haydn F. White & Company, 1740 East 12th Street, Cleveland, Ohio, is distributing a 4-page folder describing Protex—a temporary coating which protects highly finished surfaces throughout manufacture, storage and shipment of highly finished surfaces. It prevents the scratching of stainless steel, aluminum, cold rolled, plated and lithographed metals.

Protex is said to form a thin, tough elastic film which lasts until positively removed. It safeguards against dust, dirt and chemical attack, mechanical injury and adverse atmospheric conditions.

227—Cooling Coils (Water or Brine)

Young Radiator Company, Racine, Wisconsin, is distributing Catalog No. 5537 covering Young cooling coils for use with water or brine.

Comfort cooling and air conditioning is explained in an elementary and instructive manner in the introduction. Tables of dimensions, face areas, weights and catalog numbers with details of construction are given.

Examples are given for heating with water, cooling with water above the dewpoint of entering air and below the dewpoint of entering air; followed by tables of water velocities, pressure drop of water through units in pounds per sq. in. per ft. of tube length, heat transfer factors, resistance to air flow in inches, mean effective temperature difference M. E. D., notes with reference to selection of proper air and water velocities, a table of gallons of water per minute per sq. ft. face area, table of Btu per hour per sq. ft. face area sensible heat and final air temperature deg. F. D. B., followed by piping diagrams, architect's specifications, and the company's guarantee.

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For Cash Sale—Well established sheet metal shop on South side. Have several good industrial accounts. Address Key No. 413, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

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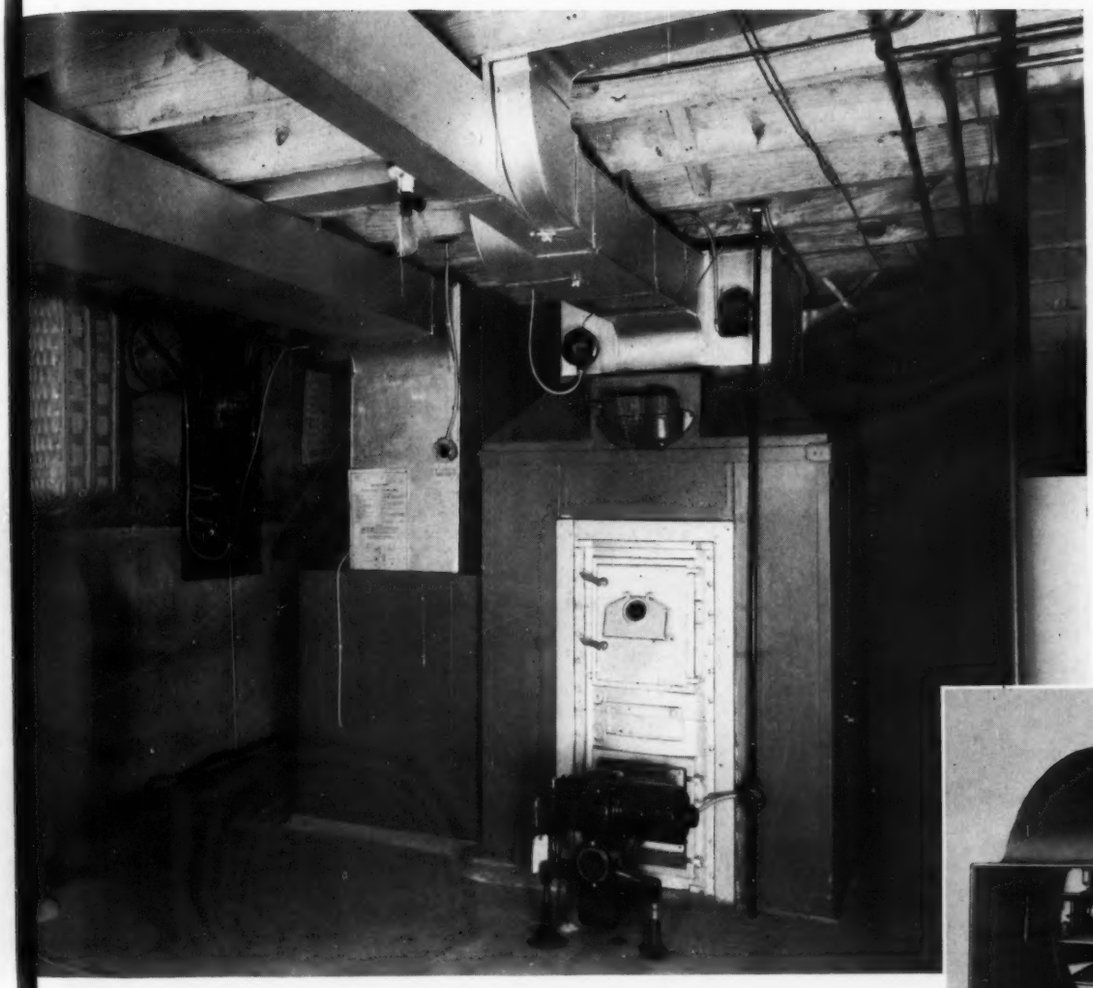
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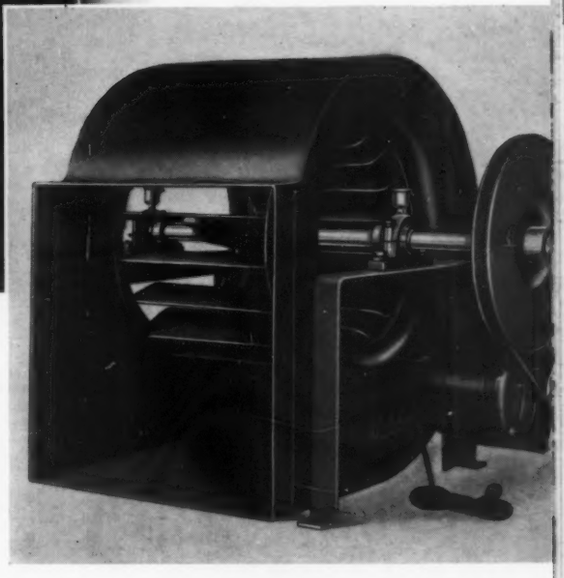
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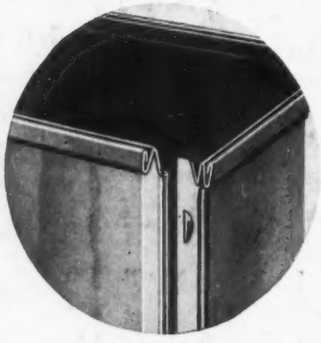
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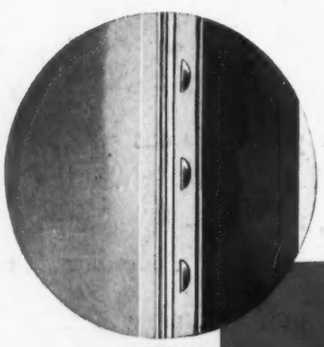
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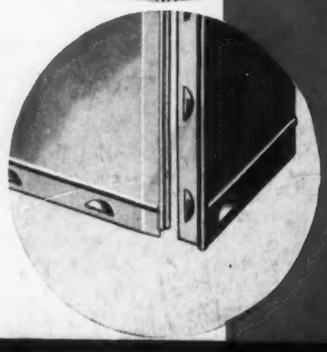


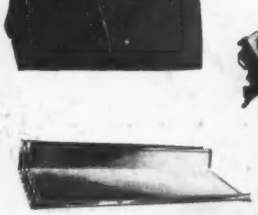
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